CHICAGO NATURAL HISTORY MUSEUM

VOLUME 32 NUMBER 1 JANUARY 1961

Bulletin

CHINESE CALENDAR SCREEN

— story on back page —

SHOUT
SHARE
IT

MUSEUM NEWS

Award

Director Clifford C. Gregg accepting, in behalf of the Museum, the 4-H Club "Donor Merit Award" for the Museum's "40 years' support of 4-H Club work through the National 4-H Club Congress" from Chris L. Christensen, President, National 4-H Service Committee. Since 1920 the Museum has organized special Museum tours for 4-H Club delegates visiting Chicago during the International Livestock Exposition. The citation was presented at a luncheon held in the Conrad Hilton Hotel on December 6.

Nature Photo Contest

Entries to the 16th Chicago International Exhibition of Nature Photography, to be held in the Museum February 5–25, 1961, must be submitted not later than January 16 to qualify for exhibition, according to contest officials.

The exhibition will be composed of two divisions, prints and transparencies, and no more than four entries may be submitted in either category. Subject matter of the photographs may be animal life, plant life, or any other natural history subject such as clouds, landscapes, ancient ruins, etc.

Winners in the various print and slide classifications will be awarded silver medals and ribbons, with the medal winners also receiving the Museum BULLETIN free for a year. Names of winners will be inscribed on the Myrtle R. Walgreen plaque on display in the Museum. Projection of the accepted slides will take place on February 5 and 12, Sundays, at 2:30 P.M. in the James Simpson Theatre.

The international photography exhibition is sponsored jointly by the Museum and the Chicago Nature Camera Club. Members of the Museum staff who will act as judges in the exhibition are John R. Millar, Chief Curator of Botany, and Dr. C. Earle Smith, Jr., botanist and photographer.

New Board Member

At the December meeting of the Board of Trustees, *Mr. J. Howard Wood* was elected a Corporate Member and a member of the Board.

Mr. Wood, President of the *Chicago Tribune* Company, is well known in Chicago both in business and civic circles.

Chamber Music Concert

The world premiere of a new composition for string quartet and piano by Willard Straight, young American composer, conductor, and pianist, will highlight Free Concerts Foundation's third program in the 1960–61 concert series in James Simpson Theatre, Wednesday, January 11, 8:30 P.M. Straight will play the piano part in his new quintet, which was commissioned by Mrs. J. Dennis Freund especially for the Foundation's second concert season. Joining him, will be the Festival String Quartet: Sidney and Teresa Testa Harth, violins; Rolf Persinger, viola; and Robert LaMarchina, cello.

The program will also include the Ravel Sonata for violin and cello and Kodaly's String Quartet Number 2.

Tickets to the January 11 free concert may be obtained by sending a self-addressed, stamped envelope to Free Concerts Foundation, Chicago Natural History Museum. The next free concert will be on Friday, February 3. (Tickets will be available after the January concert.)

From the Library

Ornithologists and bird fanciers are informed that there is now available in the Museum's third floor scientific library a copy of *Birds of North Carolina* from the North Carolina State Museum. The volume, by T. Gilbert Pearson, C. S. Brimley, and H. H. Brimley, gives the story of every bird known from North Carolina—including introduced species such as the starling and the English sparrow, and the extinct paroquet, passenger pigeon, and ivory-billed woodpecker. The birds are arranged and described according to the latest American Ornithological Union Check-List. Habits, ranges, songs, calls, and the identifying marks are clearly presented, with 47 illustrations (24 in color) providing further identification. The book also contains a history of bird studies made in North Carolina, beginning with the year 1584, plus a comprehensive index and bibliography.

Chicago Natural History Museum

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Roosevelt Road and Lake Shore Drive, Chicago 5

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Members are requested to inform the Museum promptly of changes of address.

Staff Promotions

The following promotions in the scientific staff of the Museum are announced effective January 1, 1961:

Phillip Lewis from Associate Curator of Primitive Art to Curator of Primitive Art.

Dr. John B. Rinaldo from Assistant Curator in Archaeology to Associate Curator of Archaeology.

Dr. Louis O. Williams from Associate Curator of Central American Botany to Curator of Central American Botany.

Dr. Edward Olsen from Associate Curator of Mineralogy to Curator of Mineralogy.

Lectures Given

The ancient beaches of Lake Chicago were studied last month by a group from the Chicago Academy of Sciences in a tour led by *Harry Changnon*, Geology Curator of Exhibits.

Eugene S. Richardson, Jr., Curator of Fossil Invertebrates, spoke on "Paleozoic Fossils of the Chicago Area" at the Chicago Academy of Sciences during November.

C. Earle Smith, Jr., Associate Curator of Vascular Plants, discussed plant circulation on the "Science in Motion" Educational Radio Series presented by Radio Station WBEZ (FM) last month. The program was later rebroadcasted by Radio Station WIND.

Rainer Zangerl, Curator of Fossil Reptiles, lectured this fall before the Rockwell Literary Society, Rockwell Women's Club, on the Mecca project—a pioneering undertaking in systematic research in which Dr. Zangerl plans to reconstruct exactly what existed in one Indiana county during a particular four-year period, 250 million years ago. The lecture was one in a series that has been scheduled by the women's club on the history of Parke County.

Television Participation

Maryl Andre of the Raymond Foundation will appear on Lee Phillip's "Friendship Show" (CBS-TV, Channel 2, 8:30 A.M.) on Saturday, January 7 to present a special program on "animal tracks." The "Friendship Show" is a children's production that has enjoyed popularity for a number of years on CBS.

FROM THE BOOK SHOP

The Story of Geology, by Jerome Wyckoff. Golden Press, New York. 177 pages. $4.95.

The Story of Geology is a stimulating departure from the treatment of elementary geology which has become more or less standard over the last twenty years. In the past, the approach to the subject has been largely paleontological and tended to emphasize the exotic and extraordinary in an effort to capture the imagination of younger minds. One is often left with the impression that the greatest part of the earth's history is dominated by the "terrible lizards" of the Mesozoic.

In this book the approach is strongly oriented toward physical geology, and deals with the day-to-day processes that have acted to form the earth over the past five billion years: the action of surface and ground waters, the action of ice and wind, the effects of changes in land elevation and sea level, volcanism, sedimentation, and the formation of metamorphic rocks. In addition, the author covers the larger problems of the internal structure of the earth, the formation of continents, and the structure of ocean basins.

In itself, this treatment is not unique, since it may be found in all texts of elementary physical geology. However, in concise terms the author also presents the evidence upon which the conclusions are based. For example, he points out what earthquakes are, how they are detected, and how they are located. He diagrammatically shows the principle upon which a seismograph is built and what it measures. In writing such a book the author could easily have drawn from current textbooks. However, one finds almost startling references to geologic processes and research results that are currently being discussed in advanced texts and technical journals. As examples: he treats of chemical diffusion as a process in the formation of metamorphic rocks; he notes that granite may form metamorphically as well as by igneous activity; he discusses the evidence for continental drift and the migration of the earth's poles; and most surprising of all, he discusses Project Mohole, the plan now being considered to drill 25 miles down to the beginning of the earth's mantle.

It must be emphasized that this book is not a textbook of geology; it is what the title implies, a story of the geology of the earth. The book is profusely illustrated with about 160 excellent color and black and white photographs and about 90 color drawings.

Quarrying granite in Vermont. From "The Story of Geology"

Although written for the younger teenage reader, this book is heartily recommended for the adult of any age who has ever been curious about the earth on which he lives.

EDWARD J. OLSEN
Curator of Mineralogy

CHICAGO NATURAL HISTORY MUSEUM

Anthropology · · · · Botany · ·

JANUARY

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Ice is a mineral, but it is seldom pure because of admixtures of various soluble salts. Its crystallization is hexagonal, and the crystals may be prismatic. In the form of snow, the crystals are often stellate or skeleton crystals, and sometimes hollow prisms.

The hardness of ice is about 1.5 and its specific gravity .9181. It is transparent and colorless except in large masses, when it appears bluish. By applying various temperatures and pressures to water in the laboratory, ice with seven different crystalline modifications can be obtained, though only one is found in nature. Unlike most substances, when ice crystallizes it expands in all directions—an important factor in the breaking up of rocks and mountains through weathering.

G

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All the names of the hepatica—liverleaf; noble liver-wort—relate to the doctrine of signatures of the old herbalists, which postulated that plants may possess certain medicinal or occult properties that are revealed by the resemblance of the plant or a part of it to some organ or part of the human body. The three-lobed leaves of this early spring flower thus suggested the lobes of the liver. There is no evidence, however, that the plant has any therapeutic value or effect on this organ. Hepaticas grow in woodlands from southern Ontario to Florida in the eastern half of the country. Locally they bloom in April. Their white to purplish flowers stand singly on slender, hairy stems that rise from a clump of half-hidden, mottled green and reddish-brown leaves.

B

FEBRUARY

Each year during February, the Hopi Indians of northern Arizona hold a Bean Dance ceremony, lasting nine days. Its purpose is to prepare for the coming agricultural season by consecrating the seeds, by symbolically protecting the fields against destructive forces such as sandstorms and insect pests, and by exorcising the coldest winds of winter. At the beginning of the ceremony beans are planted in the underground ceremonial chambers by the clan chief. By keeping these rooms super-heated during the course of the celebration, the beans are forced to grow. Another main feature is the initiation of young boys into the religious society by flogging. After this whipping by impersonators of spirits, the children receive new names and gifts and the bean plants are distributed.

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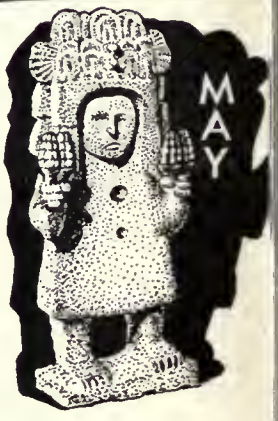
MAY



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The Aztec solar calendar was composed of 18 months of 20 days and an unlucky five-day period at the end of the year. The month, *Huei Tozoztli*, which fell at the end of April and the beginning of May in our calendar, was dedicated to Centeotl, the maize god; Chicomecoatl, goddess of maize; and to the worship of new corn. People drew blood from their ears as a sacrifice to the household gods, who were concerned in various ways with farming. The house altars were decked with new corn plants and offerings of food were made. A procession of young girls carried loads of seed corn to the temple of Chicomecoatl. After being blessed by the goddess, the corn was then returned to the granaries.

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MARCH

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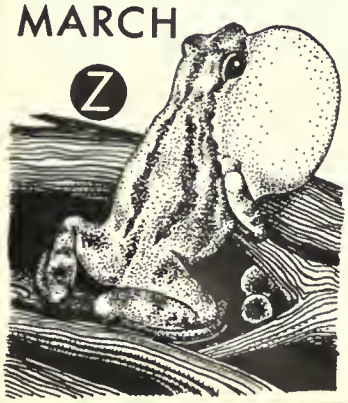

Over much of the northeastern quarter of the United States, the swamp tree frog is the first animal to announce the coming of spring. In the latitude of Chicago, around March 15, this little frog begins to call from every swampy meadow and clogged roadside ditch. Though snow and ice may interrupt its breeding choruses, this frog chirps a firm promise of spring to people weary of the long winter.

Calling and breeding continue until sometime in May, each female laying approximately 500 tiny eggs. The tadpoles hatch in a few days but require about two months to develop into half-inch frogs. Then the young join the adults in feeding on small insects and spiders, storing up energy to carry them through hibernation and the next breeding season.

G JUNE

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Records kept for some one hundred years show that more meteorites fall in June than in any other month. The reason is not known; some have attributed it simply to the month's favorable weather, which lures more observers out-of-doors. It should be noted, however, that June's high count drops to nearly half that number in July, when the weather is equally pleasant.

Until man-made capsules were recovered from outer space, meteorites provided our only tangible source of knowledge regarding the universe beyond us. Meteorites can be grouped into three classes: stone, iron-stone, and iron, and so far as their structure and composition are concerned there can be little doubt that they are of igneous origin. The most likely theory traces their source to some shattered planet or planets; other suggested explanations of their origin, whether in comets, the rings of Saturn, or the Sun, have not proved entirely satisfactory.

Geology .... Zoology calendar for 1961

JULY

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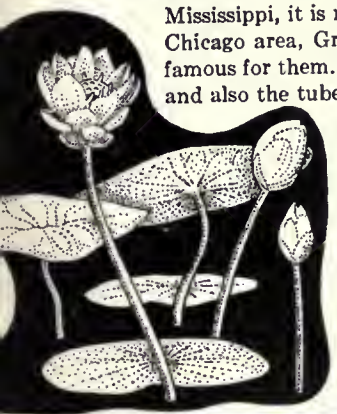
The yellow Nelumbo, or water chinquapin, an aquatic plant of lakes, ponds, and quiet streams, opens its four to ten-inch, pale yellow flowers in July. Its large circular leaves curl and sway above the water, borne on stout stems attached to the center of the undersurface of the leaf. Widely distributed east of the Mississippi, it is nonetheless rare in its range. In the Chicago area, Grass Lake in the Fox Lake region is famous for them. Indians roasted and ate lotus seeds and also the tuberous roots.



The oriental lotus, or sacred bean, is like the American lotus except that its flowers are pink. It has figured extensively as a symbol in the art and religions of India and other Asiatic countries. The Egyptian lotus, a water lily belonging to a different genus, was also a symbol used in that country's art and religion.

B

Witch hazel trees, like old coquettes, sportively decorate their branches and twigs with yellow flowers when most plants of our climate have given up for the season and are settling down for the winter. Even as it is dropping its own yellow, wavy-edged leaves and popping its seeds from woody, two-beaked capsules started in growth a year before, the witch hazel unrolls four curious, strap-like petals in each flower, and clusters the flowers in yellow, tousled heads at points where leaves are or were attached to twigs. Forked branches of witch hazel have been used in rhabdomancy in the same manner as the European hazel and doubtlessly with the same efficacy. No barbered man is unfamiliar with aromatic, astringent, witch hazel lotion.

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B

OCTOBER

The traditional birthstone for August is e mineral sardonyx. A form of chalcedony, hydrated silica, it has a transparent, deep ddish-brown color alternating with black white bands. Ita name is derived from ardis, the capital of the ancient kingdom Lydia in Asia Minor. Long used in the aking of intaglios and cameos, this ornaental stone was also prized as a signet for arking wax seals, because, as Pliny states, t signeth very faire without any of the wax icking to it." St. John refers to it as one of ie 12 gemstones in the walls of New Jerusam. And a traditional verse warns:

Wear a sardonyx, or for thee
No conjugal felicity!

lo wonder that now, as in ancient times, good uality sardonyx is still sought after by gem utters!

AUGUST

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NOVEMBER

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This is the month of the waterfowl, the ducks and geese that seem almost reluctant to leave until the first freeze locks the small lakes and ponds and drives them south. Stand outside on a raw November morning with low flying clouds and snow squalls in the air, and first you will hear a faint, wild honking, and soon you will see the ragged V's of the Canada geese driving south before the wind.. As they pass by they will be joined by earlier migrants who remained with us for a while. But this is not the end of our waterfowl, for already the winter ducks are on Lake Michigan, and when the northeasterly winds blow, golden-eyes, old-squaws and mergansers will take shelter in our harbors, where even the city dwellers can enjoy them.

One of the first signs of fall is the migration of the Monarch butterfly. In early September, during the peak of the flights, one can watch a continual stream of Monarchs as they move south along the lakefront, 5 to 30 feet above the ground. Those that pass through or leave from he Chicago area probably go on to the gulf states or northern Mexico. En route, large aggregations numbering nany thousands of butterflies may gather nd roost overnight on trees and shrubs. They may be attracted to favorite trees ear after year. At least two annual roostng places have been known in Lincoln Park. n some localities the migrants overwinter n large inactive colonies. Some famous verwintering sites are protected by law.

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Z

SEPTEMBER

The Temple of Heaven is part of a ceremonial complex formerly devoted to the observation of the winter solstice by the Chinese emperors at Peking. At the turn of the sun each December the Emperor, representing his people before Heaven, was the chief figure in a severely formal ritual. Following two days of fasting, the Emperor proceeded to the Temple of Heaven to make obeisance to Heaven and the imperial ancestors. After a final night of spiritual preparation in the Hall of Abstinence, the Emperor moved at dawn to the Altar of Heaven, a low, circular, three-tiered structure of white marble, oriented to conform with the cardinal directions. In the exact center of this large and elegant structure, the Emperor fulfilled his religious and ceremonial obligations to Heaven, thus assuring the continued welfare of the State.

DECEMBER

A

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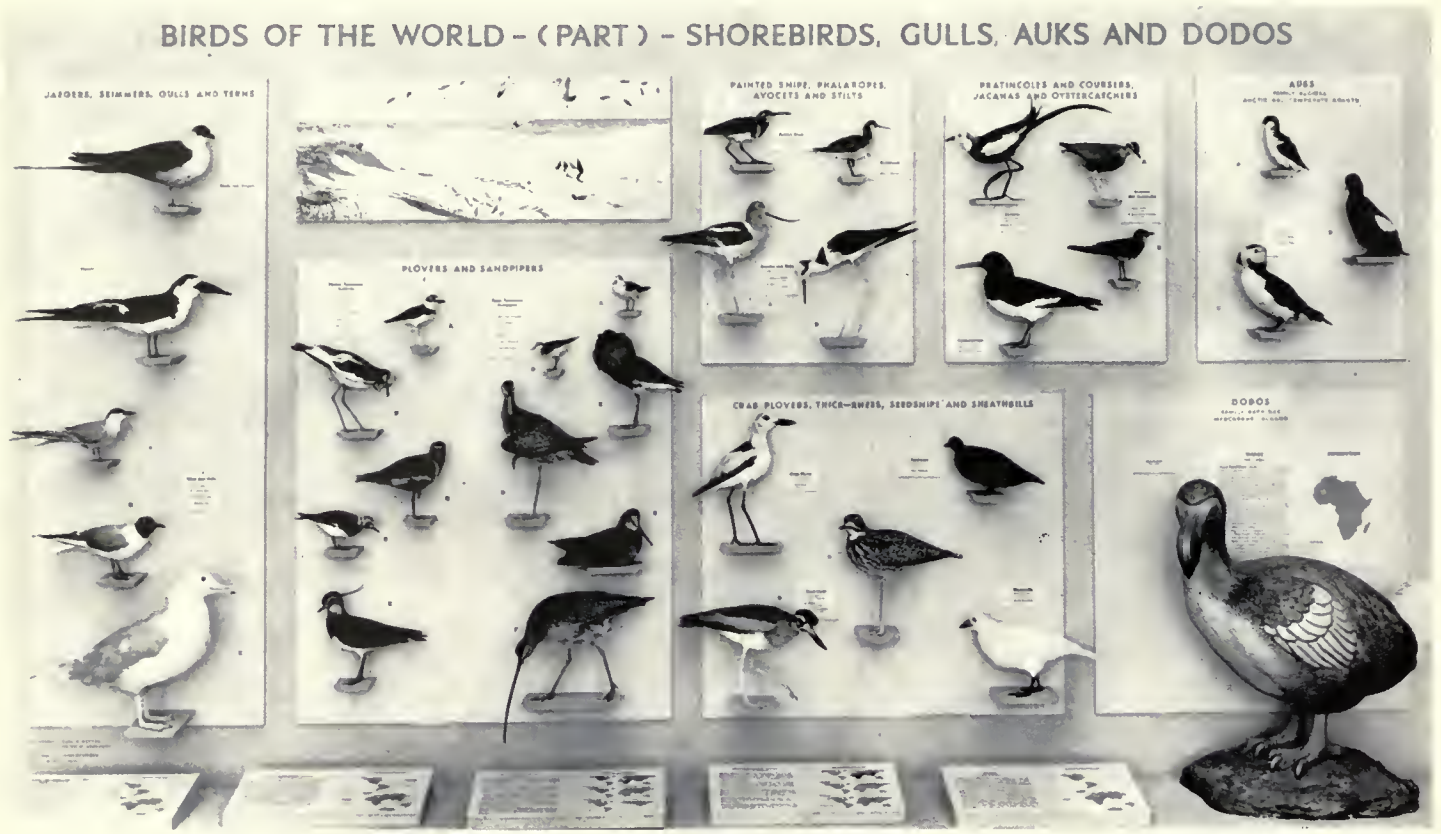
A Bird's Eye View . . .


BIRDS OF THE WORLD - (PART) - SHOREBIRDS, GULLS, AUKS AND DODOS
JAEGERS, SKIMMERS, GULLS AND TERNS
PLOVERS AND SANDPIPERS
PAINTED SNIPE, PHALAROPES, AVOCETS AND STILTS
PRATINCOLES AND COURSERS, JACANAS AND OYSTERCATCHERS
AUKS
CRAB PLOVERS, THICK-KNEES, SEEDSNIPE AND SHEATHBILLS
DODOS

of the

MUSEUM'S NEWEST EXHIBIT

By EMMET R. BLAKE, Curator of Birds

A new bird exhibit recently installed in Hall 21 treats in synoptic form all 16 families of the avian order Charadriiformes, a cosmopolitan group containing some 300 species. Most of these are shorebirds—plovers, sandpipers, and similar families of long-legged waders—but the order also includes many other birds of distinctive appearance and unusual habits, such as skimmers, gulls and terns, sheathbills, auks, and others.

About fifty species, representing five of the families featured in the new exhibit, have been reported from the Chicago region. The majority of these pause in the area only briefly in spring and fall while traveling between their summer and winter homes. Most shorebirds have remarkable powers of flight and some regularly migrate thousands of miles. Typical of many is the eastern golden plover, which nests in Arctic Canada and spends the winter in southern South America. Its migratory route is most unusual: the autumn flight is mainly over the Atlantic ocean, but the return trip is by way of Central America and the Mississippi Valley. The migratory pattern of a western variety of golden plover is equally noteworthy: after breeding in western Alaska, it flies 2000 miles or more across the open Pacific to winter in Hawaii, southern Asia, or even Australia.

Diversity of habits is a prominent attribute of the shorebird assemblage. Phalaropes are unusual in that the female is brightly colored and courts the male, who builds the nest and raises the young. Among painted-snipe, also, the female is dominant during courtship; she even has several extra loops in her windpipe which produce deep, booming sounds. The crab-plover, unlike any of its relatives, nests in a burrow deep within the sand and lays unmarked white eggs. Avocets, surely the most graceful of all shorebirds, feed by immersing their thin, recurved bills in the water, and then walk about sweeping the bill from side to side. The thick-knees are nocturnal and prefer grassy or arid regions to the water-side habitats favored by most shorebirds.

The sandpiper tribe is closely related to plovers but forms a separate family of about 80 species. They are found principally in open country near water, but a few species, such as snipe and woodcock, prefer marshes or moist woodlands. The plumage is usually gray or brown above and the underparts white, barred, or spotted. Although much like plovers in habits, sandpipers are more diversified in size (5–24 inches) and especially in the shape of the bill, which may be moderately or extremely long, and straight, decurved, or recurved.

One of the largest members of this family is the long-billed curlew, which measures almost two feet in length and is distinguished by its very long, downcurved bill. A smaller relative, the Eskimo curlew, was formerly very abundant but has become virtually, if not totally, extinct within recent decades. Unique among its fellows is the diminutive spoon-billed sandpiper of eastern Asia. Although superficially resembling other small sandpipers, its bill has a conspicuously flattened, spoon-like tip. The ruff, a common Eurasian sandpiper, is especially noteworthy for its remarkable courtship performance. In spring conspicuous erectile featherruffs and facial warts are grown by the males, who posture and fence at ancestral courtship areas for hours, competing for the assembled females, or "reeves." Perhaps most extraordinary of all is the fact that at other times the sexes remain apart, and even in winter live in separate flocks.

Several groups of birds related to, but in appearance quite unlike, sandpipers and their kind are sometimes called "shorebirds" as a matter of convenience. Perhaps the strangest of all is the skimmer, a tropical tern-like bird with a blade-shaped bill. In feeding, skimmers plow the water's surface with their protruding lower mandible, catching small fish and crustacea. Skimmers breed in colonies on sand beaches and are often active at night. Ocean shores and large rivers and lakes are their habitat.

Skuas and jaegers resemble gulls, but are even more aggressive and predatory. They often rob other birds of food and harass their nesting colonies. The four species of this family mainly inhabit oceans and coasts of colder latitudes, but several migrate between the Northern and Southern Hemispheres. Gulls and terns are more cosmopolitan in distribution, but nevertheless seldom venture great distances from land. Most of the 82 species prefer seashores and lakes or rivers, but some inhabit prairie marshes. Typically the plumage is gray and white, though many gulls have black wing-tips and most terns are black-capped. Gulls are essentially scavengers and have relatively heavy bills; terns have sharply pointed bills and usually dive for their food.

The auk family, which includes dovekies, murres, guillemots and puffins, is confined to the Northern Hemisphere where the various species nest in enormous colonies on rocky cliffs or islands. Puffins, comical creatures with out-sized bills, are the only auks that make nests. These are placed, safe from predators, at the ends of burrows. Most auks nest on narrow ledges and lay eggs that are pointed at one end and thus roll in small circles if jostled. Auks winter in the open sea and approach land only during the breeding season. Perhaps the most famous species is the great auk, a large, flightless bird that was exterminated by Icelandic fishermen in 1844.

Above:

Long-billed Curlew

Left:

Pheasant-tailed Jacana

Left:

Black Skimmer

Below:

Horned Puffin

FEATURED EXHIBIT *for January*

A Chinese CALENDAR SCREEN

By Kenneth Starr, Curator Asiatic Archaeology and Ethnology

PICTURED on our cover is what Western visitors to China call a "calendar screen," so named because the floral motifs dominating the twelve panels of the screen represent the twelve months of the year. Although not so common as the representations of the four seasons so frequently seen in Chinese art, these calendar screens traditionally have been prized as decorative pieces. The specimen illustrated is remarkable because the decorative elements on the face of the screen are formed from thin strips of wood upon which are glued bits of the brilliant blue plumage of the kingfisher. Made very likely either in Soochou or in Yangchou in Kiangsu Province, and dating probably from the nineteenth century, the screen was acquired for the Museum in China by Dr. Berthold Laufer in the course of the Blackstone Expedition, 1908–1910.

Measuring nearly eight and one-half feet in length by slightly more than three and one-half feet in height, the screen consists of a twelve-sectioned frame of "blackwood," into which are set twelve decorated wooden panels. The backs of the panels are admirable in their own right, for they are lacquered in dull red flecked with gold, but it is the front faces of the panels that command attention, for they bear flamboyantly decorative motifs outlined against fine black velvet. The panels are divided by the construction of the wooden frame into three groups of designs: the upper groups portray various traditional objects symbolic of Buddhism, Taoism, and Chinese folk lore; the large central motifs show some flower or plant; and the lower design areas depict ceramic and bronze pieces, most of them containing floral sprays.

It is the brilliant central floral designs dominating the front face of the screen that are associated with the months, and so give the screen its name. Just as in the United States we associate particular flowers and plants with certain holidays or seasons of the year—tulips with spring, roses with summer, chrysanthemums with autumn, and poinsettias with Christmas and winter—so also the Chinese associate various flowers and plants with the flow of the seasons—the plum with spring, the orchid or lotus with summer, the chrysanthemum with fall, and the bamboo or peony with winter.

Looking at the screen from right to left, in Chinese fashion, we see that the flowers or plants represented are as follows: 1st month, plum, the "prunus" so common in Chinese and Japanese art; 2nd month, weeping willow and *ch'a-mei* flower; 3rd month, magnolia; 4th month, peach; 5th month, the herbaceous peony; 6th month, poppy; 7th month, lotus, symbolic not only of summer, but also of Buddhism, particularly, and Taoism; 8th month, grape; 9th month, rose; 10th month, chrysanthemum, one of the oldest cultivated flowers in China and generally accepted as the symbol of autumn; 11th month, bamboo; and 12th month, the tree peony, which, like the plum, lends itself to indoor cultivation and so becomes a symbol of winter.

The dominant color in these floral motifs is the bright natural blue of the kingfisher's feathers, with pink being next most prominent, and with tinges of such other colors as canary yellow, Chinese red, purple, and several shades of brown. The choice of flowers and their arrangement is arbitrary on the part of the artisan.

Such objects as this screen, it must be emphasized, cannot be judged as botanically accurate. Neither should they be considered as fine art. Rather, such pieces must be recognized for what they represent, namely, the decorative, but overrefined work for which one class of Chinese artisanship is renowned. Seen so, our screen deserves some praise for the ingenuity, skill, and patience involved in its making.

The screen is exhibited in the Chinese gallery (Hall 24), at the north end of the second floor, near the east stairway.

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Vol. 32 No. 2
February 1961

museum news

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Members are requested to inform the Museum promptly of changes of address.

THIS MONTH'S COVER

"Angry Fox"
William Vokoun, Jr.
Downers Grove, Illinois
from the
Sixteenth Chicago International Exhibition of Nature Photography
sponsored by
Chicago Natural History Museum
Chicago Nature Camera Club
Stanley Field Hall
February 5–25
Showings of color slides
Sundays, February 5 and 12, 2:30 p. m.
James Simpson Theatre

Research Awards

The National Science Foundation has awarded the Museum a $12,000 grant for support of research entitled "Cultural Stability in the Upper Little Colorado River Drainage," under the direction of Dr. Paul S. Martin, Chief Curator of Anthropology.

The grant will be used to conduct archaeological and ecological studies at a series of sites in Apache and Navajo Counties in east-central Arizona. Within this area, research will be concentrated on the ruins of an unknown culture, the Snowflake, which takes its name from the nearby, contemporary town of Snowflake, Arizona. It is believed that the origin, development, and dispersal of this early culture may hold some of the keys to the later developments of Hopi and Zuni cultures, which apparently arose from a common source in this area. If ties between the Hopi or Zuni cultures and earlier ones located in the drainage of the Upper Little Colorado can be established, archaeologists will then possess an unbroken, documented sequence of culture history in this region extending across a period of some eight or ten thousand years.

The National Science Foundation has also awarded the Museum a $9,800 grant for the use of Dr. John W. Thieret, Curator of Economic Botany, in furtherance of his study of flora and vegetation in the region that has now been made accessible by the newly-constructed Yellowknife Highway, located in the Southwestern District of Mackenzie, Northwest Territories, Canada. Dr. Thieret began his field work in the highway region in 1958 and 1959 and will continue and complete it during the course of the 1961 and 1962 Northwest Territories Botanical Expeditions.

Chamber Music Concert

Free Concerts Foundation will bring The Quartetto Italiano to Chicago on Friday, February 3, to highlight its fourth free concert, an extra program in the 1960 series being presented in the Museum's James Simpson Theatre.

The program will consist of the Haydn Quartet in E flat major, opus 33, number 2; Beethoven's Quartet in F major, opus 135; and the Ravel Quartet in F major.

Free tickets to the concert may be obtained by sending a self-addressed, stamped envelope to the Chicago Natural History Museum, East Roosevelt Road and Lake Shore Drive. The concert begins at 8:30 P.M.

From left to right, Sir Edmund Hillary, Kumja Chumji, and Mr. Desmond Doig, on the Museum steps.

"Yeti Scalp" Identified

As all Chicagoans know, the so-called "yeti scalp" discovered in Nepal by the World Book Encyclopedia Himalayan expedition was recently brought to Chicago to be identified by scientists at Chicago Natural History Museum. Mr. Philip Hershkovitz, Curator of Mammals, made the first correct identification of this object, which had been the target of much speculation and which was an important good luck charm for the Nepalese villagers to whom it belongs. The headgear was pin-pointed by Mr. Hershkovitz as an artifact made from the hide of a serow, an Asiatic goat-antelope.

After the problem of identification had been solved, Sir Edmund Hillary, leader of the Himalayan expedition, Mr. Desmond Doig, its official reporter, and

Kumja Chumji, Sherpa villager who accompanied the "scalp" to Chicago, toured the Museum. The exotic display from Tibet (see featured exhibit for February, page 8) was a special delight to the Sherpa, who hurried excitedly from case to case, pointing out familiar objects. When he broke into a dance and chant at the sight of one festival costume, he and the other members of the expedition were invited to return to the Museum the next day, when his dance was color-filmed and sound-recorded for the files of the Department of Anthropology.

Right

Mr. Philip Hershkovitz (left), Curator of Mammals, and Dr Kenneth Starr, Curator of Asiatic Archaeology and Ethnology, leave the Division of Photography after filming and recording Kumja Chumji's dance.

Below Left

Kumja Chumji, Sherpa villager who accompanied the antelope cap to Chicago, pays his respects to the Tibetan God of War, February's featured exhibit (see page 8).

Scientific Meetings

Mr. D. Dwight Davis, Curator of Vertebrate Anatomy, at the annual meeting of the American Association for the Advancement of Science last month, was elected managing editor of the journal, *Evolution*. In addition, he was appointed chairman of the Morphology Section of the American Society of Zoologists.

An important part of the science meeting was a symposium on "The Evolution of Feeding Mechanisms in Vertebrates," in which Mr. Davis, and *Dr. Robert H. Denison*, Curator of Fossil Fishes, participated.

Expedition

Chicago Natural History Museum has launched a scientific expedition to Suriname. Purpose of the Museum's expedition is to study and collect the little known animals—principally mammals and birds—of the interior. The expedition began last fall and will remain in the field for approximately one year.

Suriname is one of the countries of the Guianan region, a vast territory lying between the Orinoco, Negro, and Amazon Rivers in northeastern South America. Studies that have been made of the animals of Suriname are based on specimens observed and collected along the coast only.

The primary focus of the Museum's expedition, therefore, will be on the interior, particularly the highlands and along the Brazilian border. On the basis of an adequate and representative collection of specimens, as well as information about them recorded in the field, research will be carried out on the classification, distribution, and life histories of Suriname mammals and birds.

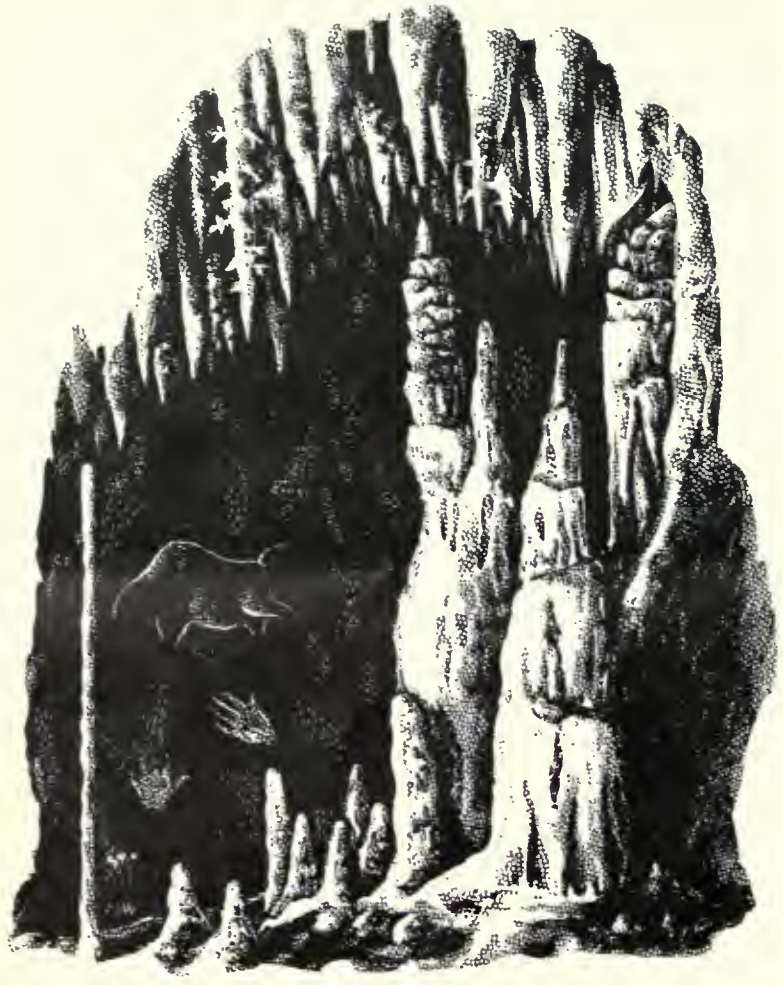
The first member of the expeditionary party to take to the field was Harry A. Beatty of New York. Beatty is an experienced bird collector who has already made many collections, particularly from Africa, for the Museum. He arrived in Paramaribo, the capital of Suriname, in September, and is proceeding to the headwaters of the Suriname River.

Philip Hershkovitz, Curator of Mammals will follow later this winter and will remain in the field for several months, taking personal charge of the expedition's activities.

The research on mammals undertaken by the expedition is being aided by a grant from the National Science Foundation; the bird studies are being supported by the Museum's Boardman Conover Fund.

Audubon Lecture

"The Shandon Hills," a color motion picture on the changing seasons in central California, will be presented free on Sunday, February 19 (2:30 P.M.), in the James Simpson Theatre by the Illinois Audubon Society.



Standing at

The Wellsprings

of the

WORLD'S ART

By Maidi Wiebe, Geology Artist

NEAR the little River Vezere, in the rocky hills of the Dordogne in south central France, is the entrance to one of the most beautiful and significant caves of the Ice Age: Lascaux. Here, drawings have been found that rank with the finest artistic creations of man. My long-standing dream of seeing them was fulfilled last summer, when I visited the prehistoric caves of France and Spain.

The Lascaux cave has been known only since the autumn of 1940, when four boys from the nearby village of Montignac discovered and explored a hole in the ground from which cold air was streaming. The first ones to descend through this aperture in modern times, they soon found themselves in a gigantic grotto with walls covered over and over with paintings.

They reported their strange discovery to their teacher, Laval. Realizing its significance, he immediately informed the well-known archaeologist, Abbe Professor Breuil from Paris, who just at that time happened to be in Brive, less than thirty miles away. Under his guidance, the cavern was systematically explored. Because of its narrow, hidden entrance, the cave's treasures had remained unknown till our day, undisturbed and unaffected by cold, heat and damp. The paintings appear as fresh as if the unknown artist had finished them just yesterday.

In order to open the marvelous grotto of Lascaux to the world, it was necessary to build a new, less tortuous entrance. I made my way easily down the steps that now lead to the cave's earthen threshhold. Two thick, steel doors protect the inner vault and help to maintain a constant temperature between 50° and 57° Fahrenheit. The moment these doors opened and closed behind me, the earth I knew seemed far away. Before me was a subterranean world. Dim lamps, well hidden behind rocks, threw a soft light upon the walls and ceiling of a great hall, nearly ninety feet long by thirty feet wide. Everywhere, animals marched and galloped in long processions: wild horses, cows, bulls, and deer. Some were small—not larger than a foot; others were larger than life.

It seems natural to think that the beginnings of art would somehow be stiff—but these paintings seemed to be alive, to breathe, to speak. What made them so impressive was not their age, nor the fact that they had been created during the awakening process of human life, but the paintings themselves—their form, color, and masterly art—which rank them among the greatest that man has ever created.

The cave of Lascaux dates from the period between the Aurignacian and Magdalenian cultures, and corresponds to that of Cro-Magnon man, about 20,000 years ago. Such caves were never used by paleolithic men for living quarters, but only for ceremonial meetings and religious purposes. The artists portrayed hunting scenes with animal traps and flying arrows. The many paintings of pregnant animals suggest that fertility rites were probably performed.

In order to light their caves, the artists

Frieze of horses and oxen painted in prehistoric times on a wall of the Grotto de Lascaux

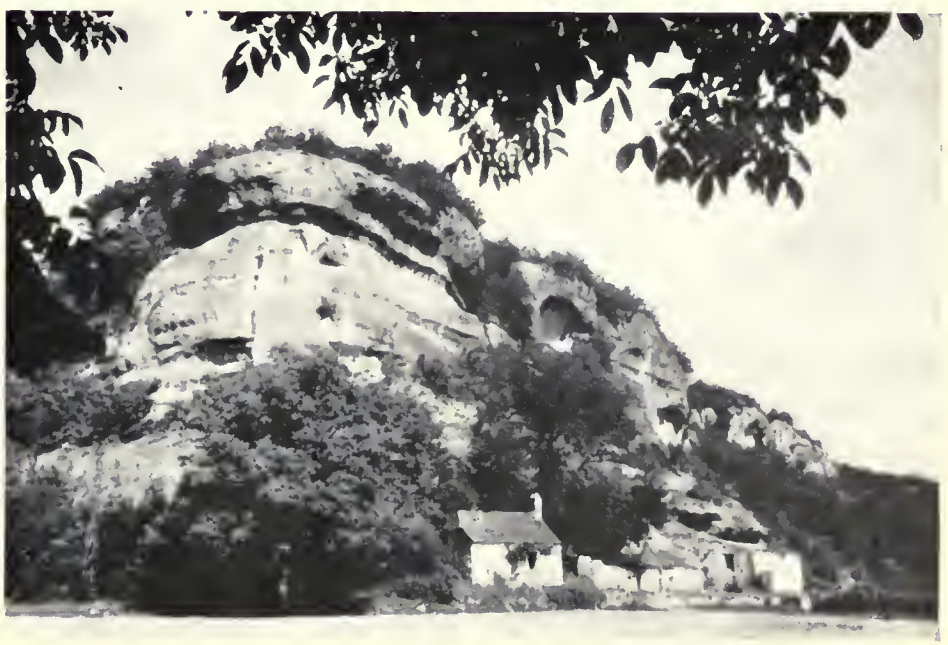
used earthen dishes filled with oil, on which dry, burning moss probably floated. Such dishes have been found but, strangely enough, they have left no smoke stains on the caves' walls or ceilings.

The hard, crystalline rock of the walls of the main hall did not permit the making of engravings but only of paintings of an unusual brilliance, enhanced here and there by a transparent layer of calcite. A well-developed technique was employed. Through hollow bones (many of which can now be seen in the local museum), the early artists blew powdered clay, red ochre, and oxide of manganese onto walls that had previously been moistened with animal grease and oil. In this way, they were able to create soft nuances, and a harmonious blending of colors. Gradually, the technique progressed from the monochrome silhouette to the perfection of polychrome painting. We do not find the full scale of hues, however. Blue is missing, as well as green. For those colors there were no clays, no rocks, which the artists could pulverize and use.

For reasons that have been suggested, the bodies of the animals were most important to the artists. Quite frequently, therefore, their proportions were overemphasized, details such as horns, manes, eyes, and limbs being added in black and in much smaller scale. The outlines were always graceful. The drawing demonstrates that the artists had an exact knowledge of anatomy, but by omitting everything inessential to their purpose, the paintings appear less naturalistic than impressively symbolic.

Quite frequently one notices how certain stains, bumps, and rugged textures of the wall inspired the artist. In the Lascaux cave, the natural rim of a rock forms the crest of a bison; a hump fits well within a bulging belly, another around a thigh, giving the painting the appearance of being half in relief. In the fresco of the five stags, the outstretched necks and heads of the animals are painted above a rock which resembles a wave, giving the strong impression that the small herd is swimming through a lake or stream.

Often, animals were painted in overlays on top of each other, which indicates that the cave was used over long periods of time by different generations. There were probably two reasons for such overpainting: first, in order to save paint, which must have been quite precious and rare; and second, because the first picture might have brought good luck to the hunter and therefore warranted being redone over and over again.



Rock caves of Font-de-Gaume

After leaving Lascaux, I climbed into my Volkswagen for a trip further south, through the lower valley of the Vezere to the caves of Lex Combarelles and Font-de-Gaume. There I saw several hundred fine engravings of animals. Continuing the tour, I drove through the rocky landscape of the Dordogne into the beautiful valley of the Lot, winding mile after mile on serpentine roads through steep, descending slopes and dense pine forest, before I finally stood at the entrance of the Pech Merle cave. The scene was that of a fairyland, where phantasy mingled with reality. Well located lamps illuminated the almost unbelievable beauty of an immense grotto. Here, as I had at the rim of the Grand Canyon at night, I stood and "listened" to the silence. Stalactites, like embroidered curtains, dropped everywhere from a dome-shaped ceiling to meet the stalagmites below. The latter pointed upward with bony fingers; some resembled twisted ropes, frozen waterfalls, or organ pipes. The guide touched these with his little stick. There!—they began to resound, each one in a different tone, vibrating

Entrance to cave of Font-de-Gaume

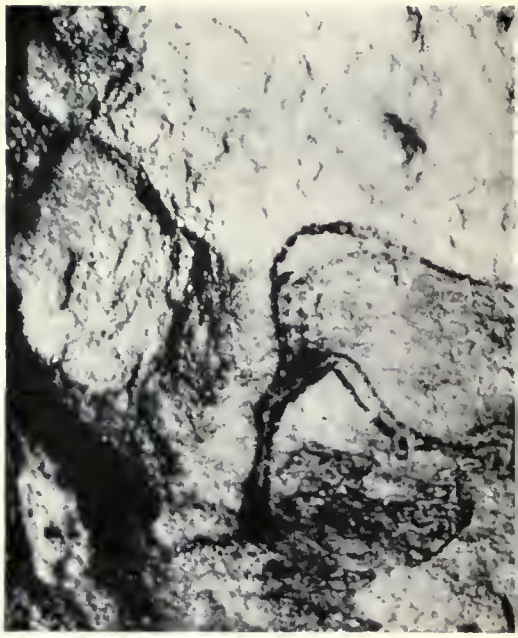
through the space. No instrument could ever imitate such sounds.

It was here, among moist, glittering temples, pagodas, and richly ornamented columns, that I compared my hand with the hands of our early ancestors which I found stenciled on the walls of the first, second, and third floors of the cave. Their palms had been large with relatively short fingers. The little finger was always curved in a way that my hand could not imitate.

Everywhere, the guide pointed out the engraved or painted representations of mammoths, cows, horses, and other animals. None was as finely drawn or clearly preserved as at Lascaux, nor did they match the monumental dimensions—eighteen feet in length—of one memorable Lascaux bull. The ceiling of the Pech Merle cave was engraved with a crowded mass of animal and human figures, hard to identify because they were drawn on top of each other.

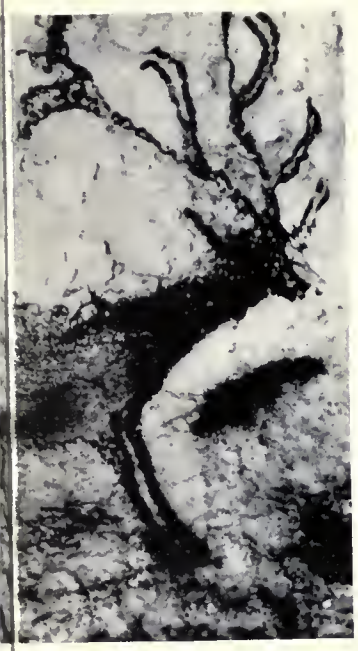
The way to the prehistoric caves of France and Spain is sometimes strenuous and difficult. Neither country makes any special effort to attract tourists, and, surprisingly to me, people I asked for directions sometimes had not the slightest idea that there was any cave in their vicinity. An exception to this was the parking area immediately in front of the entrance to the Altamira cave in Spain, which showed signs of resembling a popular amusement park. At the caves I had previously visited, the number of persons in our group did not exceed ten or twenty. Here, about sixty happily chattering people entered at the same time, shattering the sense of serenity I had felt in other caves.

View from cave in El Castillo Mountain



Altamira, in the Cantabrian Mountains, is one of the first caves to have been re-discovered by modern man. Because of its unique beauty, it has been called the Sistine Chapel of the Ice Age. At first, the visitor does not notice any paintings. Only irregular humps and bulges protrude everywhere from the ceiling. Gradually, as you walk beneath them, the outlines of animals can be discerned, and you realize that the artist had allowed the natural contours of the cave's ceiling to guide his painting. To his eyes, trained by observation, a mere hump in the wall evoked the sudden memory of a bison painfully collapsing in death; so he created, completing the form with color and line, from nature's inspiration.

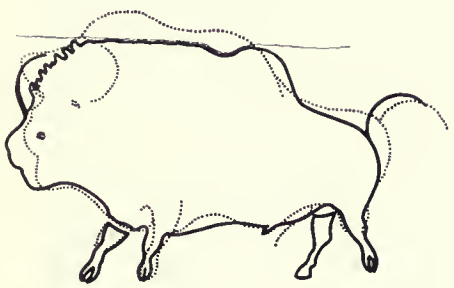
A few hours' drive southeast from Altamira rises the cone-shaped mountain, El Castillo. Here was the final stop on my tour. In the sweltering heat of a sunny noon, I climbed a small footpass to the entrance of the first of five caves situated in a circular position around the cone. Las Monedas, La Pasiega, La Flecha, Las Chimeneas, and El Castillo are still without any lighting installations. The other visitors and I groped our way behind our guide, who held a carbide lamp. For almost five hours, we followed him through the mysterious darkness of passages and halls, climbing upstairs and down. The hollow sound of water dripping from a stalactite somewhere around



Painting of stag on wall of Lascaux cave

us, and the noise of our footsteps on the hard-packed, sandy floor, were familiar sounds in the strange, deep silence. Now here, now there, our guide lifted his lamp, illuminating line drawings—elegant, or clumsy; some engraved, others painted in red, yellow, or black. Wild horses, ibexes, cows, bison, deer, and even an elephant graced the walls of this labyrinthian underworld. Most of the drawings belonged to the Aurignacian epoch. But one painting—a bison in La Pasiega, seemed familiar. Hadn't I seen it before?

Not until I returned to the United States and compared various reproductions of cave drawings with each other, did I discover that the La Pasiega bison bore a striking resemblance to one of the paintings from Lascaux. Had there



Superimposed Lascaux and La Pasiega bison

been, then, an early school of art flourishing in both localities? Or a traveling artist? Or was it mere coincidence?

I could only conjecture.

FROM THE BOOK SHOP

The Care of Pet Turtles by Herndon G. Dowling and Stephen Spencook. New York Zoological Society. 16 pages. 25 cents.

For the last few years the New York Zoological Society, which operates the Bronx Zoo, has been running experiments designed to solve the problems of raising young turtles. The results of these experiments have been summarized in this popular, illustrated leaflet. It includes sections on housing, feeding, and identification of the turtles likely to be purchased in American pet shops. The instructions are simple and easy to carry out. There are also brief discussions of the growth, development, and health problems of turtles.

As a large proportion of the telephone inquiries to the Division of Amphibians and Reptiles concerns the care of pet turtles, we propose to keep a copy of this leaflet next to our telephone. We advise every parent of a would-be turtle raiser to purchase one; for twenty-five cents parents can avoid one of life's minor concerns.

ROBERT F. INGER
Curator of Amphibians and Reptiles

The Lower Animals, Living Invertebrates of the World. Ralph Buchsbaum and Lorus J. Milne. Doubleday & Co., Inc., Garden City, New York. 1960. 303 pages, 315 illustrations, including 144 in full color. $12.50. (A previous volume in this series, *Living Reptiles of the World*, was written by the Museum's former Chief Curator of Zoology, Karl P. Schmidt, and Robert F. Inger, Curator of Amphibians and Reptiles.)

Here, between the covers of a single, manageable volume, are marshaled the salient facts on the natural history of invertebrates exclusive of insects. The authors cover 27 phyla of the animal kingdom, ranging from the smallest and simplest to the largest and most complex of animals without backbones. The text is readable and non-technical. Where necessary scientific names are given without apology, which is as it should be when common names are lacking. A bibliography of 53 titles leads the reader to more detailed popular and technical literature.

An outstanding feature of the book is the beautiful photographs, many in natural color, which portray the animals as they appear in their native haunts, from the depths of tropical seas to the fields and forests of northern climes. Except for the inclusion of certain arthropod groups—centipedes, millipedes, and the

Photo from *Living Invertebrates of the World*

spiders and their kin—the scope of this book is the same as that of the Museum's Division of Lower Invertebrates. Thus the interested reader may regard it as an expanded guide book to the invertebrate exhibits in Hall M.

In the chapter on Mollusks, an unfortunate omission of the heading Pulmonata, following the third paragraph on page 182, causes the pulmonates, or air breathing land and fresh-water snails, to be discussed under the heading Opisthobranchs, which are marine gastropods.

The volume provides fascinating browsing, and will prove a very useful reference work.

ERNEST J. ROSCOE
Division of Lower Invertebrates

TIBET!

FEATURED EXHIBIT *for February*

TIBET, which for centuries had been a semi-independent theocracy with a medieval culture, for the past decade has been politically controlled by the Chinese communist government. The religious leaders of the country, together with thousands of refugees, have crossed the Tibetan borders to enter its neighboring kingdoms and northern India. Within Tibet itself, traditionally cherished ways of life are being rapidly and forcibly changed.

The awesome and terrifying figure of the Tibetan God of War vividly symbolizes these events. Constructed of papier-maché and painted in red, green, and gold, it stands more than five feet high. The deity's hair is represented as in flames, and his brow is crowned with a row of human skulls. His three eyes are intended to penetrate the past, the present, and the future. Draped over his shoulders are garlands of severed heads and skulls. The right knee is bent, the left stretched—a marching posture. While this image stands on reddish clouds, another representation of the god made of hammered copper, and also on exhibit, shows him with one foot trampling a horse and the other a woman.

The war god is but one of the hundreds of exotic objects on display in the Tibetan hall (Hall 32, second floor, north end). The collection was obtained by the Museum's Blackstone Expedition to eastern Tibet in 1908–11, under the leadership of Dr. Berthold Laufer, then the Museum's Assistant Curator of Asiatic Ethnology (later Chief Curator of Anthropology), and one of the world's most noted oriental scholars. During the Expedition's stay in Tibet, Dr. Laufer assembled a collection that illustrates every phase of the material culture of the country and is of the greatest value to scholars specializing in the history of Asiatic culture.

For example, Dr. Chie Nakane of the University of Tokyo, a social anthropologist and specialist in Tibetan history, recently spent a year teaching at the University of Chicago. While in Chicago, she studied and catalogued the Museum's library of rare Tibetan books, which fascinated many Museum members who saw it displayed on Members' Night last year. Most of the books are Buddhist scriptures printed by Lamaist monasteries for the instruction of their own monks. Others tell the histories of famous monks and kings, or are compendiums of knowledge about astrology, medicine, grammar, and the like. The books are printed from wood blocks on paper that is sometimes poison-impregnated; in a few cases they are on leather. Many of them are illustrated in color, and some are lettered in gold—in this, they seem reminiscent of the exquisite illuminated manuscripts of medieval Europe. Written in a language whose letters are borrowed from Sanskrit, although linguistically related to Chinese, the books read from left to right, as in English. This library of Tibetan literature is typical of the many kinds of materials secured by Dr. Laufer which have been used by scholars in making contributions to our knowledge of the general history of human culture.

Also displayed in the Tibetan hall are temple libation bowls made of human skulls, a ceremonial apron of carved human thigh bones (see Chicago Natural History Museum publication, "Use of Human Skulls and Bones in Tibet," by Berthold Laufer. Popular series. 10c, postage 5c), vivid paintings of gods and sacred ceremonies, and ornate bronze censers. Gorgeous robes and fantastic masks, which graced the mystery plays performed by Tibetan lamas at the beginning of each new year, can be seen, as well as military armor and weapons, jewelry and unusual musical instruments, a delightful collection of teapots, and an exhibit explaining the art of Tibetan wood-engraving.

As news headlines continue to focus on political events in Tibet, Chicagoans will have an opportunity, paralleled in few cities of the world, to learn more about this little-known country, through the rich Tibetan collection at Chicago Natural History Museum.

P. R. NELSON

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Vol. 32 No. 3
March 1961

NEWS from CHICAGO NATURAL HISTORY MUSEUM

Cover: "Sun Drum" from Laos—Featured Exhibit for March

A LAOTIAN BRONZE DRUM, presented by the people of Laos to the people of Chicago through the CARE organization is the Museum's featured exhibit for March.

The gift marked the observance in March, 1956, of the tenth anniversary of CARE. Presentation was made to the Museum by Mr. Oden Meeker, Mission Chief for CARE in northern Laos and Indochina.

The bronze drum is an excellent example of a type known in many parts of eastern and southeastern Asia during the past 2,000 years. The Museum's specimen comes from Namtha, capital of an isolated province in mountainous northwest Laos. Lying at the uppermost reaches of the Mekong River, Namtha is in the heart of the anthropologically complex region where China, Indochina, Thailand, and Burma meet.

The drum is notable for its decorative and symbolic designs, skillfully executed in high and low relief. The center of the drumhead is marked by a circle, within which is a stylized twelve-rayed sun figure—a design that has given drums of this type the name, "sun drums." Beyond this figure are twenty-one concentric zones bearing geometric and bird designs. Four stylized frog figures are evenly spaced astride the periphery.

The drum bears a striking resemblance to a Thai bronze drum that was presented to Queen Victoria and is known, from its placement in Windsor Castle, as the Windsor Drum.

The earliest known examples of this type of drum have been uncovered in burials in Tonkin, the portion of northeastern Indochina contiguous to China. These appear to date from about the beginning of the Christian era, or perhaps slightly earlier. Since then, the drums in variant forms have been manufactured and used continuously to the present day, being particularly well represented in the large region comprised of south and southwest China, northern Indochina, northern Thailand, and west-central Burma.

The meaning of the symbolism of the designs on the drums is difficult to ascertain. One group of Chinese legends associates the drums with Ma Yuan, a Chinese general of the Latter Han period (A.D. 25–220), who carried out military expeditions against the non-Chinese peoples of the south. A fanciful tale relates that the drums were placed under mountain waterfalls so that the thunder of the water falling on them would deceive the rebellious natives into believing that the Chinese armies were near.

One of the most plausible explanations of the drums' function is that they were used in rain-making ceremonies. With their thunder-like sound and frog symbolism, such drums were thought to be effective in causing rain through the mechanism of sympathetic magic. Descriptions of rain ceremonies from the Latter Han period refer specifically to the beating of drums and the placing of five frogs in a carefully prescribed artificial pond. Bronze drums also have been used in Chinese rain ceremonials during more recent centuries, and it is known that the Karen people of east-central Burma still carry out annual rain ceremonies with "frog drums" that have been in the possession of some tribes since the twelfth century.

A fuller account of this drum and its history is given in the July 1956 issue of the BULLETIN by Dr. Kenneth Starr, Curator of Asiatic Archaeology and Ethnology.

The Laotian drum will be displayed in Stanley Field hall, suspended from a frame. A soft-headed mallet will be provided so that visitors may test the drum's tone.

Spring Children's Programs

Spring 1961 heralds another series of free Saturday motion picture programs for children in the Museum's James Simpson Theatre. Beginning on March 4 and continuing through April, the new series offers a variety of film subjects, including a study of life under the ocean; an old Crow Indian legend about a lost

(*Museum News continued on page 8*)

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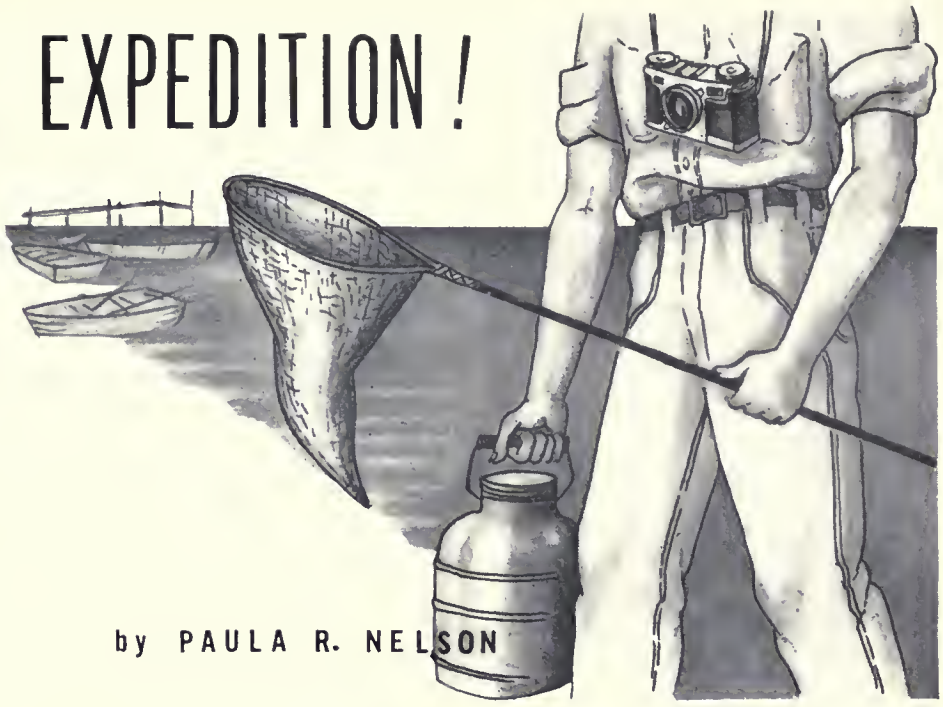
EXPEDITION!



by PAULA R. NELSON

By Staff Illustrator Marion Pahl

WHAT is a Museum "expedition"? Digging for artifacts in Central America or the Middle East to reveal vanished cultures and preserve them for future generations? A trek from Paramaribo to the headwaters of the Surinam River to collect little-known mammals and birds from the interior? Searching the rarified upper reaches of the Himalayas for the legendary "abominable snowman"? Or verifying the discovery of a tiny invertebrate species during an easy day's jaunt not far from the center of a major Midwest city?[1]

Early last fall, a young Chicago Heights teen-ager named John Dooley was swimming in the quarry on the grounds of the Lake Metonga Club, a private sportsman's club in Grant Park, Illinois, about forty-five miles south of Chicago's Loop. He noticed some tiny, translucent creatures in the water, and collected a few of them. His high school biology teacher was able to identify them—no small feat in itself—as *Craspedacusta sowerbyi*, an uncommon jellyfish that is one of the very few species known to exist in fresh water. The teacher suggested that John notify scientists at Chicago Natural History Museum.

Dr. Alan Solem, Curator of Lower Invertebrates, took the call and immediately decided to go out to the site and see for himself. Although he had collected invertebrates in many parts of the United States, he had never encountered jellyfish in our inland waters. D. Dwight Davis, the Museum's Curator of Vertebrate Anatomy, was eager to try his skill at photographing this unusual species. Some years before, Henry Dybas, Associate Curator of Insects, and Harry G. Nelson, Assistant Professor at Roosevelt University, had had the good fortune to collect a few specimens in central Indiana. Now Dybas was out of town, but the other three—Solem, Davis, and Nelson—organized an "expedition" on the spot.

I was invited to come along in the role of recorder. Like Mrs. Solem, who also joined us, I was curious—about the jellyfish, of course, but even more about the natural scientist's experience of a day in the field. Perhaps by sharing it I could probe—in a small way, to be sure—the meaning of "expedition."

It was a delightful autumn morning when we left Chicago. I listened while the others chatted in the car. "To me, the exciting thing about this discovery," Nelson was saying, "is that very few species of jellyfish live in fresh water. There are other fresh-water Coelenterates, but only a very few fresh-water medusa forms have been reported."[2]

Davis agreed. "There's something special about finding jellyfish, which everybody associates with salt water, in the middle of the great land mass of the United States."

"And another thing. Although they belong to the same class as the hydras—hardly more than primitive blobs of protoplasm—they seem more exciting because their movements and behavior are more dynamic, and can easily be observed with the naked eye."

We drove past farms that were fast being converted to suburban developments. Pigs, onion fields, corn, dairy cows, and even beef cattle were cheek-by-jowl next to new commuters' homes. These changes in human ways of living were of interest to me. The attention of the others was caught by the insects that rasped and buzzed in the wayside fields and ditches. "Some day," Davis said, "I'd like to take a tape into a beech-maple forest I know and record the progression of insect sounds throughout a twenty-four-hour period. Seems to me this might make an interesting addition to our school programs." Then, "This must be the moraine." We were approaching a gently rolling, wooded height. "Probably the southern limb of the Valparaiso extension."

"Look at the erosion on that slope!"

As naturalists, they kept watch for any locality that might offer possibilities for future field exploration. Someone asked if anyone had investigated the forest preserve on our left. Noting that most of the trees were oaks, they discussed the spread of the oak wilt, which has begun to make serious inroads on our forests. "It's somewhat like the Dutch elm disease," Nelson recalled. "A killing infection. The plants don't seem to develop immunity. Often,

[1] "It is significant that the Museum now lists most of these trips on our records as 'field trips' rather than as 'expeditions.' 'Expedition' carries with it the idea of long journeys and of finding a way over unknown terrain. . . . On our field trips now we can be rushed to the other side of the globe by airplane, we can plan our investigations with the aid of good maps. . . . Although exploration in a geographical sense is a thing of the past, we are still exploring on the frontiers of knowledge. . . ." *Report of the Director to the Board of Trustees for the Year 1959*, p. 22, Chicago Natural History Museum, 1960.

[2] In addition to *Craspedacusta sowerbyi*, two other species, one each from Africa and China, have been reported.

black oaks will die in the first year after the disease hits them, while some of the white oaks hang on for five or six years."

A Monarch butterfly hit our windshield and was damaged beyond recovery. "They're migrating now." I asked, "Do you mean that butterflies migrate south, like birds?" "Oh, yes," was the answer. "Migration studies have been made in which the wings of the butterflies are stamped or tagged so that their migration patterns can be traced, just as with the birds. It's now known that Monarchs may migrate a thousand miles or more, and that many of the same individuals return."

"What about the Monarchs that breed farther north—along the Canadian border? Would they have enough time to make a return trip before they die of old age?" Davis speculated.

"That's certainly the first question that comes to mind.[3] Curious—it's the same question we're asking, too, now that we're thinking of possible human migrations to other planets. It wouldn't be the same generation to arrive that departed."

"That would be a heck of a way to spend your life—en route."

"Maybe it's not much different from what we do here on this planet, anyway."

"Look at the midges!" Clouds of insects, light as spindrift, were suspended in puffs over the ditches beside the road. A bird floated, motionless, on the rising air. As we tried to identify it from the speeding car, we almost hit a fox squirrel streaming across our line of vision, with its tail flat against the road. In another few minutes we were in Grant Park, and, turning off the highway, entered the grounds of the Lake Metonga Club.

Up at the clubhouse, we explained our mission. The officials there were expecting our visit and offered us every facility we needed. We headed for the boat dock. I felt that we looked a strange crew. Intruders upon a gay resort scene, with people all about us dressed in bright play clothes and bent on pleasure, we were awkwardly conspicuous in the rough field clothes that constitute the naturalist's working garb. This was surely a strange place to be conducting a Museum field trip! What could we possibly find here that would be of use to natural history research? Apparently I was not the only one who doubted, for almost without discussion, we agreed not to unload our equipment from the car but to row out onto the water-filled quarry first, to reconnoiter.

Near the center of the quarry was the submerged sandbar where young Dooley had collected his specimens. Dubiously, we began our search.

Five minutes passed. We saw nothing unusual in the mustardy-green waters lapping the boat. I began to regret not having brought my swim suit. Then Solem called out, "I see one!"

"Where?" But it was gone. We scanned the murky water, mourning our lack of a glass-bottomed vessel. Then Nelson spotted a second specimen. "It was floating downward, with its mouth up." Davis questioned, "Would that be a healthy condition?" "I think so," Nelson said. "They pulsate up to the surface and then turn over, spread their tentacles, and drift down. Food caught on the tentacles is pushed against the mouth of the creature, and this seems to be the main way it feeds."

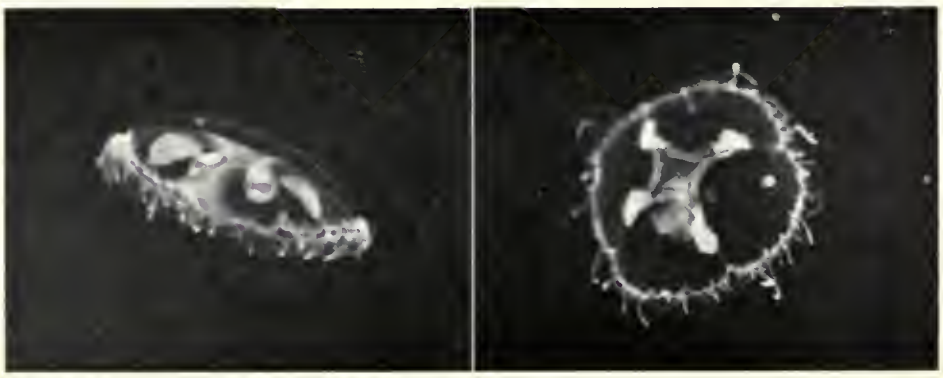
Reassured by the sighting of two specimens, we rowed back to the dock to get our collecting gear. Out of the car trunk were unloaded a gallon thermos jar, a dipping net, a long-handled pan, a shallow enamel tray, hand lenses, a thermometer, still and motion picture cameras, and—perhaps by mistake—the quart thermos jar of coffee I had insisted on bringing along.

With this gear and our party now disposed in two boats, we headed once more toward the sand bar. Again, Solem was the first to descry a specimen. But someone else happened to have the net, and by the time we got it to him, the jellyfish was out of sight. We leaned over the sides of the boats, concentrating on the search. Then Davis said, "Here's one."

Nelson quickly reached out with the net and snagged the creature, but when the net was brought close to the boat and examined, we found that the jellyfish had eluded the snare. A pause while Nelson peered into the water around the net, a deft maneuver with the pan, and then, "Here it is!" We all crowded close to examine the first, live, freshwater jellyfish that most of us had ever seen.

What was it like? To me, it appeared hardly more than a thready blob of mucous—and even that, partly transparent—but somehow it was unaccountably, excitingly alive. Vigorous contractions sent it pulsating through the water; a delicate fringe of tentacles waved rhythmically beneath a tiny, umbrella-shaped body. We marveled, and turned to the search with fresh energy.

In a few minutes, Nelson's dipping net reached out and another specimen was secured. It, too, was poured into the shallow tray for examination, and then into the gallon jar. We began to sight larger numbers of specimens. Everyone was eager to catch his share, but there was a shortage of dipping vessels. Someone noticed the coffee thermos, unscrewed the top, and passed the cups around. We each had a utensil now and, leaning over the water at comic angles, began to haul in specimens at a great rate.



The hunted: Craspedacusta sowerbyi

[3] Recent evidence indicates that, in the case of Monarchs that breed north of the 48th parallel, the returning butterflies are the next generation offspring of those that began the migration the year before.

The hunters: Solem and Nelson (photograph by Davis)

I had remained aloof from the collecting in order to take notes, but now I stopped writing for a moment to watch the jellyfish in the shallow tray. As the sun cast the organism's shadow on the bottom of the pan, I saw its contracting inner structure and waving tentacles projected in shadow lines larger than life. Somewhat to my surprise, I was suddenly determined to catch one of the creatures myself. Grasping a thermos cup, I made some awkward passes at the water, but kept missing the exasperating animals. At last I triumphantly maneuvered one into the cup and drew it in. Then Solem, who had been collecting steadily for the last ten minutes, generously handed me his net. With this more efficient instrument, I snared two or three specimens at a fair distance from the boat and transferred them to the thermos with immense satisfaction.

We then turned to the problem of photographing the specimens. In the water, the organism's structure had appeared tenuous. Seen in silhouette, against the pan, however, the exquisitely proportioned design was perfectly etched, and we hoped to capture it on film. As Davis and Solem worked, I asked about the organs within the creature's umbrella. "Gonads," explained Nelson. "With one recorded exception, wherever these fish have been taken, all the specimens have been of one sex or the other. The theory is that they don't spread in the jellyfish, or medusa, stage but in the polyp stage, attached to ducks or other water fowl, or occasionally an aquatic plant. The polyps themselves exhibit no sexual structures or activities, but when a polyp buds, the medusae it produces are either all male or all female. The conclusion, therefore, is that each colony of jellyfish probably starts from a single polyp."

"The possibility that intrigues me," Nelson went on, "is that these jellyfish are really quite common in lakes and ponds but are never noticed or reported. When a large population like this is found, the implication is that it has been gradually building up over several years to the point where it is finally noticed. In general, the distribution of the species seems to be spotty, which is probably attributable to their chancy means of transportation."

"I shouldn't think they would do well in a stream that had much current," Davis suggested.

Nelson agreed. "So far, they have nearly always been found in impounded waters, which suggests that the body of water has to be of a certain size, so that it doesn't undergo extreme changes in temperature. A shallow pond or a running stream, for example, might not provide these conditions."

Earlier, Davis had suspended our thermometer a few inches below the surface of the water. Now he pulled it up and reported that the water temperature was 77° F.

In about an hour, we had collected several dozen specimens—an adequate series. A score of these would be preserved in formalin and added to the Museum's research collection of invertebrates, where they would be available for study by scientists here or in other parts of the world. The remainder of the specimens would be transported to the Museum for photographing and observation as long as they survived. As we surveyed our collection, now gathered in a feathery mass at the bottom of the thermos jar, Barbara Solem asked if these tiny medusa forms were related to the giant and dangerous Portuguese "man-of-war." "Yes," was the reply, "but distantly." Solem reminded us that members of different classes of vertebrates are more closely related to each other than are members of the same classes of invertebrates. Then he, too, had a question. "If a group of whales is a gam, what would you call a mass of jellyfish?" At this, Dwight decided that it was time to up anchor. With it, there came an adequate sample of the life of the quarry environment—water weeds, algae, water insects, and minnows. Rowing back to the dock, we laid plans to check the quarry again next year.

We had packed our gear into the car and were ready to leave the club grounds, when we missed the dipping net. It had been left in one of the boats. Hurrying back to the quarry's edge, we discovered that a party of young girls had taken that boat out onto the water again. There was nothing for it but to row after them. A brief chase, and we were within hailing distance. "Have you seen a net in your boat?" we called. "Oh, yes," they replied. "We noticed it here. But we didn't touch it," they assured us. As I reached over the side and retrieved the net they held out, I reflected that I, too—*yesterday*—might have found a net in a boat and never once thought to dip it into the water.

ANNOUNCING . . .

The Spring Travel Lectures

. . . for adults

THE 115TH SERIES of free, illustrated lectures for adults opens Saturday, March 4, in James Simpson Theatre. Variety, color, and adventure keynote the new series, which begins in the icy wasteland of Antarctica: continues on to the tropical islands of the Caribbean, the Pacific, and the Indian Ocean: makes a stop at the historic country of Greece; and finally winds up on the snow-covered Austrian Alps. The travelogues, all filmed in color, are presented each Saturday during March and April under the auspices of the Edward E. Ayer Lecture Foundation. Each film is narrated in person, and the lectures begin at 2:30 P.M. Reserved seats will be held for Museum Members until 2:25 P.M. Here is your spring travel itinerary!

March 4—The Penguin Egg and IGY

Carl Eklund
Washington, D. C.

An isolated glacial outpost called Wilkes Station, one of the United States bases in Antarctica during the International Geophysical Year, provides the setting for this fascinating film documentary by Dr. Carl Eklund about one aspect of I.G.Y. Eklund, who was scientific leader of the experimental station, has recorded in color the many interesting activities of the "operation deep-freeze" at Wilkes, including a perilous descent into an Antarctic ice pit down to a layer of ice formed almost two centuries ago. One of the most unusual I.G.Y. projects presented in the film is the installation of a miniature broadcasting station in a penguin egg for the transmission of temperature signals. Eklund brings to his program a knowledge of the Antarctic based on a long personal association with the area.

From "Indonesia"—April 8 lecture

March 11—The Quest Eternal

Henry W. Briggs
Skowhegan, Maine

A remarkable film of Maine's wild life in its eternal quest for the fundamentals of life—food, shelter, and the reproduction of species. Through the color camera, we follow that quest, watching the wild life of forest, field, and pond—deer, bear, and moose; birds, flowers, and insects. To highlight the story of the food chain, the camera records the story of a dead tree, which furnishes food for many creatures. Among these is the Pidgeon Horntail fly, whose large-headed larvae gnaw tunnels through the wood while a protozoatic organism within the borer's body converts the chewed-up wood cellulose into protein. This protein, in turn, nourishes woodpeckers and many human tribes in tropical regions. We also see the astonishing female ichneuman fly drill through inches of dry, hard wood to deposit her eggs on the same borers. And the amazing details of pollination in flowers like the cypripediums, the laurel, and the Jack-in-the-pulpit reveal still other aspects of the eternal quest. How these living species—both plant and animal—seek the essentials of life is traced through the entire seasonal cycle of spring through summer, and fall into winter.

March 18—Wyoming

Alfred M. Bailey
Denver Museum of Natural History

Possibly no area in the United States offers more to travelers than Wyoming. Certainly no one knows it better, or has filmed it more beautifully, than Dr. Bailey, Director of the Denver Museum of Natural History. Those who have heard him before in the Museum's lec-

ture series will welcome him back with delight as they view his new film on the grandeur, historic sites, summer activities, and wild life of this fabulous western state. The sequence of Dr. Bailey's lecture begins with springtime on the high plains and Frontier Days at Cheyenne; continues to old Fort Laramie northward past the Salt Creek oil wells, taking in the All American Indian Celebration at Sheridan; pictures the magnificent Tetons and Jackson Lodge; shows some especially fine close-ups of grizzly bears at Yellowstone Park; turns back in the fall to Wyoming's eastern plains—Douglas and the State Fair; lingers at the Star Valley along the Idaho line and at the picturesque Snake River, with its banks in marvelous autumn color; and finally ends at the Yellowstone River, where the lodgepole forests are a fairyland in winter dress.

March 25—"Forbidden Islands" of the South Pacific

Aubert Lavastida
University of Michigan

Mr. Lavastida is Director of the Motion Picture Production Unit at the Audio-Visual Center of the University of Michigan. In 1948 he began production of the history-making Tropical Byways Series, a group of films featuring remote areas of the world, far from the normal tourist routes. "*Forbidden Islands*" *of the South Pacific* is the sixth, and most recent film produced for this series. It transports the viewer to enchanting Polynesian islands that still retain much of their primitive culture. Through the camera's magic, we take off from the island of Upolu in Western Samoa, where tourists are still forbidden, and travel westward by copra boat to several far-flung islands of the Fiji group—known of old as the Forbidden Islands. On each island, we enter the heart of village life—we relax in the islanders' homes, share their meals, watch their industry, enjoy with them their recreations, songs, and dances. A high point of the film is the celebration of Queen Elizabeth II's birthday on the island of Suva, with feasts, pagaentry, and traditional dances dating back to the days of cannibalism.

From "Greece"—April 22 lecture

April 1—Caribbean Crescent

James Metcalf
Dowagiac, Michigan

Another island hopping trip! But this time, across the Caribbean to South America. First port-of-call is Jamaica, vacation land supreme and the site of ancient Port Royal. Then on to Grand Cayman, thriving center of the Caribbean turtle industry, and inhabited by the descendants of English pirates. A stop at the new resort island of Cozumel in the Yucatan Channel winds up with a thrilling shark-spearing expedition, filmed underwater. After a tour of the ancient Mayan ruins of Tuluum, Mr. Metcalf shows us Isla Margarita, the "island of pearls," where pearls are offered for sale by the half-bushel. Toward the end of our travels along the Caribbean "crescent," we land at Surinam, or Dutch Guiana, on the mainland of South America. Here lives perhaps one of the most polyglot populations on earth, and the camera focuses on as many of them as possible—from the primitive descendants of escaped slaves to Eurasian women with gold rings in their noses. The contrasts Surinam offers are seen in sharp relief as we first visit Djuka and Amerindian villages and watch palm oil being produced by primitive methods, and then are shown the country's booming, modern aluminum industry.

April 8—Indonesia

John Nicholls Booth
New York City

The five-year-old Republic of Indonesia—which has been called a Pacific Shangri La—is a romantic chain of islands extending three thousand miles from the Indian Ocean to the Pacific. Scientists regard Indonesia as one of the oldest centers of human life—Java Man, for example, lived there 300,000 years ago. Now it is the sixth most populous of the world's nations, and the third richest country in natural resources—potentially, one of the Far East's strongest nations. Out of this background, Mr. Booth has created a film story that is an exciting blend of cultural research, adventure, exploration, and news headline hunting! As his camera travels across the island chain, we visit Java—with all the glories of the Javanese Sultans, shadow-puppet plays, Buddhist temples, and Hindu shrines of antiquity; Borneo—third largest island in the world, with its tribes of ex-headhunters; Bali—lush, tropical isle, famed for carvings, dances, and gamelan orchestras, where poetry in color, motion, and form abound; Sumatra—which holds much of the wealth of the Indies.

April 15—Gone With the Wilderness

Karl Maslowski
Cincinnati Museum of Natural History

"Just a short time ago, this was nothing but a wilderness." How often we hear that statement when visiting a new housing or industrial development, or outlying shopping center. Karl Maslowski, board member of the Cincinnati Museum of Natural History and writer of a weekly nature column in the *Cincinnati Enquirer* for almost a quarter century, has also seen the march of civilization in the midwest—trees bulldozed, fertile meadows cemented over, whole marshes drained. He admits that this

has been America's destiny, but calls for retaining what little wilderness remains. His camera shows us what we lose when the bulldozers move in—woodlands where the summer tanager sings and the katydid strums; quiet marshes filled with queen's lady slipper orchids, sundew plants, cottonwoods and alders; windswept prairies with a red-shouldered hawk overhead and meadow grasshoppers below, and where prairie chickens dance each spring on the open grounds.

April 22—Greece

Gerald Hooper
Chicago, Illinois

Greece—birthplace of the gods and of civilization as we know it! This sunny land, which has inspired centuries of art, is the subject of a fresh, new film that records the life and activities both of the Greek mainland and of the Mediterranean islands—Crete, Corfu, Rhodes, Mykonos, Hydra, and Delos. The camera takes us to the valley of 10,000 windmills, so high in the mountains of Crete that it is rarely seen by travelers. Archaeology comes alive as Professor Carl W. Blagen of the University of Cincinnati explains the work of his crew at the site of the ancient Palace of Nestor. It was Nestor, along with Agamemnon, who outfitted the Greek expedition against Troy. The elaborate palace believed to be his was sacked and burned by Dorian invaders 1200 years before Christ. Other marvels of the ancient world are shown, also—the Acropolis; Delphi, where the famed oracle gave advice that sometimes determined the course of history; Delos, island birthplace of Apollo; Olympia, renowned for the Olympian Games. Nor is modern Greece neglected: in Athens, for example, the camera captures all the pageantry of the Royal Family's participation in a festive St. Paul's Day celebration.

April 29—Austria

Neil Douglas
Meriden, Connecticut

Join the contagious gayety of the Austrians as they relax to the music of "Fledermouse" heard by the shores of Lake Constance. Visit Vienna, with its blue Danube, vineyards, parks, composers, fabulous architecture, "grinzing," coffee houses, and charming store windows. Enjoy world-renowned Salzburg, city of monuments, markets, and music. Roam historic cities and royal castles. Explore the glacier at Silvretta, bright with funiculars, toy trains, and vivid costumes. Marvel at the Oetztal Valley, where exposed chair lifts draw the skier 9,000 feet up to the Wildspitze. Soar thousands of feet with the Zell Am Zee glider school, and finally join the student mountain climbers on the highest of the eastern Alps, to see spectacular falls on the rope and plunging skiers set against the breathless beauty of the Grossglockner. You'll find it the gayest holiday of them all!

MUSEUM NEWS

(*Continued from page 2*)

lake, pink snow, and a grasshopper glacier; the story of the Eskimo, in life and legend; a Hans Christian Anderson fairy tale; and even a journey through space, beyond the solar system we know, into the far reaches of the sky. The film programs are presented at 10:30 A.M. Children may come alone, in groups, or accompanied by adults.

Following is the complete film schedule for March and April:

March 4—The Ocean

March 11—The Land of Pink Snow

March 18—The Living Stone

March 25—Emperor's Nightingale

April 1—No Program
(Easter week-end)

April 8—Indian Lore
(*Camp Fire Girl Day*)

April 15—Around the World in Chicago (*Girl Scout Day*)

April 22—The Universe
(*Museum Traveler Day*)

April 29—Treasure Chest U.S.A.
(*Cub Scout Day*)

Free Concert

Baritone William Warfield joins the Festival String Quartet on April 5 in the James Simpson Theatre in a program which will include, among other selections, two Bach cantatas. In addition to the quartet that evening there will be assisting instrumentalists to comprise the small orchestra required for the Bach cantatas. The program will begin at 8:30 P.M.

Tickets to the concert may be obtained by sending a stamped, self-addressed envelope to Free Concerts Foundation, Chicago Natural History Museum, Roosevelt Road and Lake Shore Drive. Free parking is available in the Museum's north and southeast parking lots.

New Museum Journey

An ocean treasure hunt is in store for girls and boys visiting the Museum during March, April, and May when the Raymond Foundation offers its new spring Journey, "Between the Tides." Children old enough to read and write will have an opportunity to explore a world of sponges, sea urchins, sea stars, corals, and other marine invertebrates—some of the strangest and most beautiful animals in the world—by obtaining travel instructions and questionnaires at the information desk, or the north or south door, and following a carefully charted route leading to the Museum "sea shore."

A different Museum Journey is offered every three months. With the successful completion of four Journeys, a youngster receives a formal Museum Traveler certificate; with the completion of eight, he becomes a Museum Adventurer; with 12, a Museum Explorer; and after 16 different Journeys he becomes eligible for the special Journey leading to membership in the Museum's Discoverers Club.

Spring Hours

Beginning March 1 the Museum will be open from 9 A.M. to 5 P.M., seven days a week.

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CHICAGO NATURAL HISTORY MUSEUM

Bulletin

Vol. 32 No. 4

April 1961

NEWS *from* CHICAGO *NATURAL HISTORY* MUSEUM

Children's Programs

April 8—Indian Lore
(Camp Fire Girl Day)

April 15—Around the World in Chicago
(Girl Scout Day)

April 22—The Universe
(Museum Traveler Day)

April 29—Treasure Chest U.S.A.
(Cub Scout Day)

James Simpson Theatre. Saturday mornings at 10:30. Free.

Adult Lectures

Color motion pictures, narrated in person.

April 1—Caribbean Crescent
James Metcalf
Dowagiac, Michigan

April 8—Indonesia
John Nicholls Booth
New York City

April 15—Gone With the Wilderness
Karl Maslowski
Cincinnati Museum of Natural History

April 22—Greece
Gerald Hooper
Chicago, Illinois

From "Caribbean Crescent," April 1 lecture

April 29—Austria
Neil Douglas
Meriden, Connecticut

James Simpson Theatre. Saturday afternoons at 2:30. Free.

Award

William V. Kahler, President of Illinois Bell Telephone Company, has received one of the nation's top engineering honors, the 1961 Washington Award. This award is conferred annually on an engineer "whose professional attainments have pre-eminently advanced the welfare of mankind." Mr. Kahler, who has been a Museum trustee since January of 1959, was cited specifically "for distinguished leadership in business and civic affairs and for exceptional service to education and humanity."

Free Concerts

A program of baroque music and a three-day Mozart-Schubert festival will bring to a climax Free Concerts Foundation's 1960–61 concert series presented in the James Simpson Theatre.

Baritone William Warfield comes to the Simpson Theatre stage on April 5 as featured soloist in a program of music by Bach and Handel. He will be joined by assisting artists Ray Still, oboe; Don Isaac, harpsichord; members of the Festival String Quartet; and additional chamber ensemble players. The program will consist of two Bach cantatas—Number 27, "Ich habe genung," and Number 56, "Ich will den Kreuzstab gerne tragen"; an aria from Handel's oratorio, *Samson*, "Thy glorious deeds inspired my tongue"; and Handel's Trio Sonata for two violins, Opus 2, Number 6. Soloists will be Sidney and Theresa Testa Harth. The program begins at 8:30 P.M.

In May the Free Concerts Foundation embarks upon a new undertaking—the presentation of a three-day (May 2–4) festival of music featuring the works of Mozart and Schubert. World-famous musicians, including Leon Fleisher, pianist, and members of the Festival String Quartet will perform during the festival.

Tickets for the concerts may be obtained by writing Free Concerts Foundation, Chicago Natural History Museum, enclosing a stamped self-addressed envelope. Festival tickets will not be available until after the April 5 concert.

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THE BULLETIN

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Members aee eequested to ioform the Museum promptly of changes of address.

Soundtrek

Soundtrek, Chicago Natural History Museum's pioneering radio guide to the exhibits, has taken on a bright new look this spring with the arrival of gaily colored, lighter-weight receivers and new, improved transmitting equipment.

Also added recently to the Soundtrek system is an entertaining ten-minute radio-guided tour in the Hall of Pre-Columbian Indians (Hall 4), with commentary by Harriet Smith of the Raymond Foundation. Miss Smith's tour supplements the longer, more detailed tour of this hall by George I. Quimby, Curator of North American Archaeology and Ethnology.

The new Soundtrek receivers are now available to Members without charge and will be a feature of Members' Night, April 28.

WANTED:

Used Snail Shells

ALAN SOLEM, *Curator, Lower Invertebrates*

Above: The large claws of a hermit crab peer out of the mouth of a Florida fighting conch shell.

Left: Claws of the hermit crab, COENOBITA, *(left) seal shell opening as effectively as the original inhabitant's operculum (right).*

WHAT happens to dead sea snails? The soft parts are either eaten by the predator that killed the snail or quickly cleaned out by the busy scavengers of the ocean. Remaining is the rock-like shell. Eventually it is battered about and ground into fragments by waves, dissolved by boring organisms, or, together with coral and clam fragments, cemented into coralline rock. All this takes time, however, and meanwhile the empty shell has probably been put to good use by several generations of hermit crabs.

These decapod crustaceans, despite their name, are more closely related to shrimps and lobsters than to true crabs. More than 1,200 species are known, and hermit crabs are common shore inhabitants of most oceans of the world. The front portion of the crab and its appendages are heavily armoured with calcified plates. However, the rear portion of the body is soft and would be highly vulnerable were it not for the fact that the crab wedges his tail and abdomen into an empty snail shell. Once inside, hook-like structures on the crab's tail appendages cling to the inside of the shell, making it difficult to pull the animal out.

Nearly all snail shells coil to the right and the abdomen of most hermit crabs is flexed to the right to permit easier entrance into the snail shell. Young hermit crabs use small shells, changing to larger ones as they grow. Often a proposed new home will already have another hermit crab inside, and occasionally two crabs will fight over an unoccupied shell. If no suitable shell can be found, the hollow tubes constructed by marine worms, bamboo, or even a discarded metal cold cream tube or glass vial will be used to protect the crab's soft abdomen.

The most commonly seen type of hermit crab appears to be no more than "big claws and skinny legs" peeking out of a snail shell. If the shell is large enough, the crab can withdraw completely out of sight inside the shell. Many shell collectors have picked up an "empty" shell and placed it carefully on the beach in a pile to be taken home later, only to have it walk away because of a hidden hermit crab.

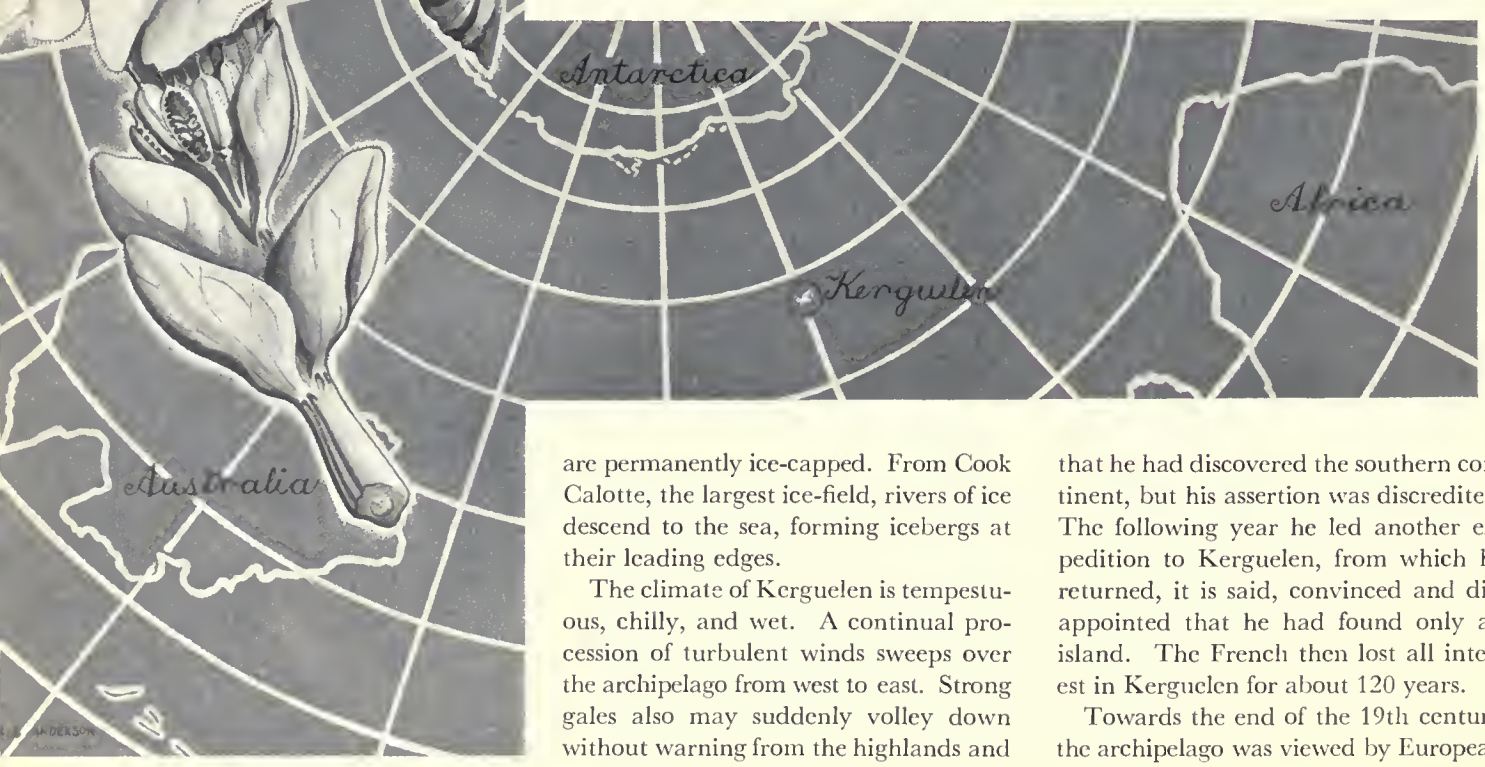
Other hermit crabs are more specialized. The Pacific Ocean snail, *Nerita polita*, lives on rocks in shallow ocean waters and has a thick calcareous plate, the operculum, on its foot. When the snail retracts into its shell, the operculum tightly closes the opening, protecting the snail both against drying out and being eaten by enemies. Empty *Nerita* shells are inhabited by hermit crabs of the genus *Coenobita*, whose claws are modified to form almost as effective an apertural seal against enemies. This is a quite marvelous set of parallel adaptations against predators. Both snail and crab seal the shell opening, but the snail uses a disc on its foot and the crab its claws.

Undoubtedly this use of empty snail shells by crabs has been going on for millions of years. An example of the use and reuse of the same shells by successive generations of hermit crabs is seen in Bermuda. There, a large snail, *Livona pica*, became extinct apparently during glacial times. But a large hermit crab, which can use only the shell of the extinct snail for protection, is still common in Bermuda. Apparently this crab will exist until the last empty shell of *Livona pica* has been cemented into rock or broken into fragments. This is a striking example of how the utmost use is made of every substance and structure in the economy of nature.

JOHN W. THIERET, *Curator, Economic Botany*

KERGUELEN'S CABBAGE

The Kerguelen cabbage is the most celebrated plant from that minuscule portion of our planet known as the Kerguelen Archipelago or, more graphically, as Desolation Land. Kerguelen, one of the few island-groups in the bleak vastness of the subantarctic Indian Ocean, is midway between South Africa and Australia and about 1,000 miles north of Antarctica. Its islands, which are of volcanic origin, are scattered over a distance of about 125 miles from north to south and 90 miles from east to west. The archipelago consists of a main island—Kerguelen Island—and some 400 smaller ones, most of which are mere islets. Kerguelen Island is about 85 miles in greatest length and width, but no part of the interior is more than 15 miles from the sea because the coast on all sides abounds in large inlets and long, narrow fiords. The loftiest peak is Mount Ross, whose fog-shrouded summit reaches 6,400 feet. The higher portions of the island are permanently ice-capped. From Cook Calotte, the largest ice-field, rivers of ice descend to the sea, forming icebergs at their leading edges.



The climate of Kerguelen is tempestuous, chilly, and wet. A continual procession of turbulent winds sweeps over the archipelago from west to east. Strong gales also may suddenly volley down without warning from the highlands and plunge with great force upon the sea, lashing the surface into foam, and hurtling the water to and fro with convulsive violence. Many a vessel, thought to be snug in a sheltered harbor, has been driven aground by these unexpected winds. Along the seashore the temperature is remarkably equable. The thermometer reading seldom exceeds 70° in summer, and is seldom less than 32° in winter. Kerguelen is a land of almost incessant precipitation. Rain and snow fall at any and all times during the year, and fogs and mists are common.

The archipelago was named after an 18th century French explorer, Yves Joseph de Kerguelen-Tremarec, who headed an expedition seeking the *Terra Australis Incognita*—the continent that was rumored to exist in the southern Indian Ocean. On the 12th of February, 1772, Kerguelen-Tremarec and his men sighted Kerguelen. They claimed it for France and then sailed home. Kerguelen-Tremarec was fully convinced that he had discovered the southern continent, but his assertion was discredited. The following year he led another expedition to Kerguelen, from which he returned, it is said, convinced and disappointed that he had found only an island. The French then lost all interest in Kerguelen for about 120 years.

Towards the end of the 19th century the archipelago was viewed by European powers with growing interest, which

prompted the French government in 1893 to re-establish possession of the islands in the name of France. Commercial exploitation of Kerguelen was assigned to a private company, first for the extraction of whale oil and later for sheep raising. The sheep farm was abandoned during World War I, and the limited supply of whales ended the activity of the whale-processing plant in 1927. Kerguelen was then practically forgotten until World War II, when German planes were based there, drawing attention to the strategic value of the islands. In 1950 the French founded the first settlement on the archipelago.

Captain Cook explored Kerguelen in 1776. His surgeon, Mr. Anderson, a student of natural history, recorded these observations in December of that year:

> "Perhaps no place, hitherto discovered in either hemisphere, under the same parallel of latitude, affords so scanty a field for the naturalist as this barren spot. The verdure, which appears when at a little distance from the shore, would flatter one with the expectation of meeting with some herbage; but in this we were much deceived. For on landing, we saw that this lively colour was occasioned only by one small plant [*Azorella selago*], not much unlike some sorts of saxifrage. . . There is another plant, plentifully enough scattered about the boggy declivities, which grows to near the height of two feet, and not much unlike a small cabbage. . . We ate [this plant] frequently raw . . . "

From the early 1800s until about 1870, sealers and whalers at Kerguelen carried on a hazardous, arduous, but presumably lucrative business boiling down penguins and elephant seals for their blubber, and hunting fur seals on the beaches and southern right-whales in the seas adjacent to the archipelago. The peak period of this depredation was about 1847, when as many as three hundred vessels were annually employed around those shores. The diminution of the fur seal, the elephant seal, and the right-whale to unprofitable numbers speedily reduced the carnage after 1850.

Kerguelen has been visited by a number of scientific expeditions and is, as a result, far from being scientifically unknown. Much of the detailed work there, however, has been done in the coastal regions. The interior of the main island and many of the smaller islands are quite unexplored because of difficulties of access presented by fiords, lakes, bogs, and mud-holes.

Among the fauna of Kerguelen the insects are noteworthy because of the preponderance of forms that are wingless or possess only rudimentary wings and so cannot fly. The archipelago's only wild land mammals are introduced rabbits, mice, rats, sheep, and dogs. Of "land birds" Kerguelen has only two, a small duck and a sheathbill, but it is, in contrast, a rendezvous to legions of sea birds, including penguins, albatrosses, petrels, gulls, terns, cormorants, and skuas. The king penguin is now scarce although these birds, along with rockhopper and gentoo penguins, are said to have existed in vast numbers there before toll was taken of them by exploiters of the 19th century. The reports of early navigators depicting the human-like mannerisms of Kerguelen's penguins gave the islands the name of the "Land of Little Men" and provided inspiration to Anatole France for his satirical novel, *Penguin Island*. No fresh-water fishes are known from Kerguelen even though lakes are common. The islands have long been a favored haunt of the elephant seal. During the first half of the 19th century these animals were almost exterminated there by sealers. After that, they seem to have increased until, at the beginning of the 20th century, they were again brought close to decimation. At present, they are on the increase once more. The fur seal, apparently never abundant on the archipelago, had become very rare by the end of the last century, but it still is found there, as is the leopard seal. In 1924, certain portions of Kerguelen and some of the other French subantarctic islands in the Indian Ocean were set aside by the French government as a national park in which the hunting of seals is forbidden.

Only thirty-three species of flowering plants, including three introduced weeds, are known from the archipelago. In addition, four ferns, two clubmosses, and numerous lichens, mosses, liverworts, and algae have been found there. No trees or large shrubs are to be seen. Indeed, no plant is taller than the cabbage, whose flower-stalk grows only as high as two or three feet. The most characteristic and conspicuous flowering plants are *Azorella selago*, which forms dense mounds that from a distance resemble mossy boulders; *Acaena adsendens*, which has prostrate stems and dense heads of purplish flowers; and *Pringlea antiscorbutica*, the cabbage.

The Kerguelen cabbage grows from creeping, half-woody stems, sometimes five or six feet long and as many inches in diameter. Its large heads of leaves, as much as eighteen inches across, are so like those of the common garden cabbage that, as Dr. J. D. Hooker remarked in his *Flora Antarctica* (1847), if they were "growing in a garden with their namesakes in England they would not excite any particular attention." The outer leaves are loose, but the inner form a compact, white heart. The flowers are borne in dense, long, and narrow clusters that arise from the stem below the head. Some of the flowers have the four petals that are characteristic of other crucifers —members of the mustard family—but most have only one, two, or three petals, or even none.

In days now past, the cabbage was abundant throughout much of the archipelago. Now it is scarce because of destruction by rabbits that have become common since their introduction by a British expedition in 1874. Fortunately, these edacious rodents have not become established on all the islands. In areas where they are abundant, they have destroyed significant amounts of the vegetation cover, with the result that soil erosion is accelerated. Kerguelen cabbage grows not only on Desolation Land but also on three other island groups in the same region of the subantarctic Indian Ocean: Heard, Marion, and Crozet. An intractable wilding, the plant has never been cultivated successfully.

Dr. Hooker suggested that the cabbage is wind-pollinated and so is different from most other members of the mustard family, for which insect-pollination is the rule. In support of his suggestion he pointed out the frequent lack of petals—a major function of petals is to attract, by their showiness, pollinating insects—and the usual absence of nectar-secreting glands in cabbage flowers—such nectaries are characteristic of most crucifers. Also suggestive of wind-pollination is the pollen itself, which is said to be different from that of nearly

(*Continued on page 8*)

MEMBERS' NIGHT!

How is a scientist able to reconstruct a period in pre-history that occurred 240 million years ago? What Old and New World birds are fast becoming extinct? What role has botany played in the historic selection of the distinctive "setts," or patterns, used in the colorful tartan plaids that have become identifying symbols for the clans of Scotland?

If you are interested in finding the answers to these questions, you'll not want to miss Members' Night at the Museum on April 28 when these and many more scientific puzzles will be explained personally by the Museum's scientific staff and through interesting exhibits especially prepared for the occasion.

Highlighting Members' Night, 1961, is the premiere opening of one of the most outstanding exhibition halls in Museum history. Now being prepared under the direction of Dr. Roland Force, Curator of Oceanic Archaeology and Ethnology, the new Hall F displays a cultural panorama of the Polynesian and Micronesian areas of the South Pacific—Hawaii, the Palaus, the Marquesas, the Carolines, the Society Islands, the Cooks and Australs, Easter Island, Samoa, Tonga, the Marshalls, Fijis, Gilberts, and New Zealand.

The nucleus of the hall's exhibits is the famed Fuller Collection, the last and finest private collection of rare, beautiful, and extremely valuable materials from the Pacific Isles. Assembled by Captain A. W. F. Fuller of London over a period of 64 years, the collection was acquired by the Museum in 1958.

On April 28, Members will also have an opportunity to preview another new hall now in process of construction. When completed, it will be probably the largest permanent exhibition hall in the world devoted solely to the display of primitive art. Comprising some 9,000 square feet of display area, it will feature approximately 300 art specimens of noteworthy aesthetic quality from primitive societies of Africa, Australia, Melanesia and Polynesia, and North and South America. These art objects are being selected by Mr. Phillip H. Lewis, the Museum's Curator of Primitive Art, from the Museum's vast archaeological and ethnological collections, totalling nearly half a million pieces.

It is such research collections—which are not on public display—in all of the Museum's four departments (anthropology, botany, geology, and zoology) that make possible its contributions to the scientific world. Basic research, the "life blood" of science, is continually in progress at Chicago Natural History Museum in offices, laboratories, and workshops far removed from the exhibition areas. On April 28—in this once-a-year event—the entire scientific staff of the Museum will be on hand personally to explain for Museum Members various aspects of the research projects on which they are presently working.

Here are just a few of the things Members can expect to see in touring the Museum's research floors on April 28.

Anthropology (3rd Floor—Southeast)

In the Anthropology Workshop

On huge tables in this room will be assembled the primitive art objects that have been selected from the Museum's research collections and are now in process of being prepared for display in the new Hall of Primitive Art.

Geology (3rd Floor—Northwest)

In the Paleontology Laboratory

A collection of fossil fresh-water fauna that lived 240 million years ago—discovered last summer by Dr. Rainer Zangerl and Dr. Eugene Richardson in a black shale quarry in Indiana—will be arranged to illustrate various stages of research. Members may learn how a scientist is able to reconstruct a specific, delimited period of prehistoric time.

In the Division of Fossil Mammals

Members may view through the microscope humeri and toe bones thought to belong to a mole-like animal that lived in western United States 20 to 40 million years ago. The structural characteristics of this animal have been reconstructed by Museum scientists out of the "trash" often discarded by paleontologists as being too tiny and broken up to yield useful results.

In the Paleontology Workshop

Now being reconstructed for eventual public exhibition is the fossil skeleton of a duck-billed dinosaur (Parasaurolophus), which will stand 12–15 feet high when completed.

In the Division of Petrology

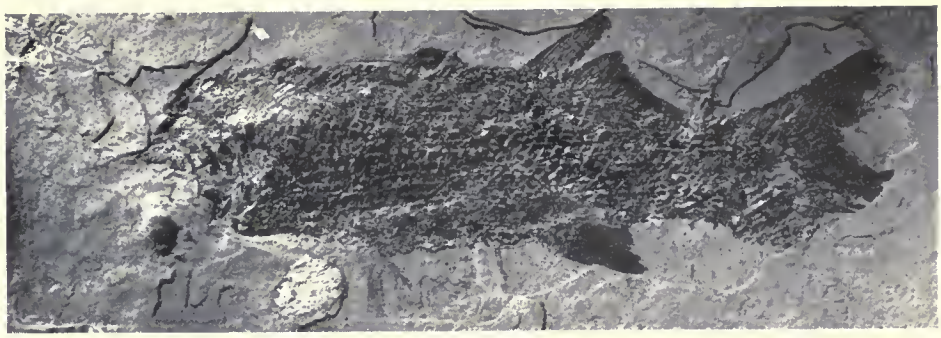
A demonstration will be given in the geochemistry laboratory on methods used in the chemical analysis of rocks.

Botany (3rd Floor—Northeast)

In the Botany Library

The fascinating history of Scottish tar-

Right: Palaeoniscoid fish from Garrard Quarry, Indiana



Below: An Eskimo curlew, one of the "vanishing" birds featured in a special Members' Night exhibit

tans, traced all the way back to the botanical origins of each pattern in the glens of Scotland, will be colorfully portrayed in an unusual botanical exhibit prepared especially for Members' Night. Members will see how the distinctive tartan patterns used as a means of identifying the many Scottish clans owe their particular selection of colors to the character of the vegetation that grew in the areas where the respective clans had their beginnings—for it was from these local plants that the tartan dyes were made.

In the Plant Reproduction Laboratory

Demonstrations will be given on the processes involved in making the Museum's world-famous plant models.

In Botany Workroom No. 9

Lichens, an example in the plant world of co-operation between two dissimilar plants enabling the two, together, to live under conditions in which neither could exist alone, will be the subject of an interesting graphic display.

Zoology (3rd and 4th Floors)

In the Division of Lower Invertebrates (4th Floor—South)

Exquisite "gems of the Everglades"—part of the Winte and DeBoe collection of Florida tree snails recently acquired by the Museum—will be superimposed on a large-scale map of Florida to show the color ranges and variations among the different populations of tree snails.

In the Department of Taxidermy (4th Floor—North)

A series of new exhibit screens entitled "What Is A Mammal?" will be seen in process of construction.

In the Division of Birds (3rd Floor—Southwest)

"Extinct and Vanishing Birds" is the subject of a display, selected from the Museum's collection of skins, of Old and New World birds that are fast becoming, or already are, extinct.

In the Division of Fishes (Ground Floor—Northeast)

An exhibit of fish jaws and teeth will show different types of dentition and how each type is adapted to the particular foods eaten by various fish species.

A new feature, introduced for the first time at this year's Members' Night, will be a Mexican market place, to be set up at the north end of Hall 2, on the main floor of the Museum near the Book Shop. Here authentic Mexican imports—rugs, clothing, baskets, pottery, jewelry, wooden ware, and many other decorative items—may be purchased from gaily costumed sales persons, making it possible for each Member to possess a permanent and valued remembrance of Members' Night, 1961.

Above: Carved wooden figure from New Zealand on exhibit in Hall F

Left: A Bapende initiation mask from the Congo area on exhibit in Hall of Primitive Art

Kerguelen's Cabbage—

(*Continued from page 5*)

all other crucifers in being much smaller and perfectly spherical. No insects have ever been observed to visit flowers of the cabbage.

The generic name of Kerguelen cabbage, *Pringlea*, was given by Dr. Hooker in honor of Sir John Pringle (1707–1782), the founder of modern military medicine. The connection between Sir John and the cabbage may seem indeed obscure at first glance, but it becomes clearer when we realize that Sir John was the author of a work on scurvy and that the cabbage was at one time highly esteemed for its antiscorbutic properties. Early sailing-ships many months out would veer far from their normal course to put in at Kerguelen for a supply of "greens."

In closing this account of Kerguelen and its cabbage, a quotation from *Flora Antarctica* is appropriate. Of the cabbage, Dr. Hooker says: " . . . its luxuriance amidst surrounding desolation, its singular form and appearance, striking even the casual observer, and the feelings of loneliness and utter isolation from the rest of the world, that must more or less oppress every voyager at first landing on its dreary and inhospitable locality, are circumstances likely to render the Kerguelen's Land cabbage, cabbage though it be, a cherished object in the recollection of the mariner: one never to be effaced by the brighter or luscious products of a tropical vegetation."

THIS MONTH'S COVER

April's FEATURED EXHIBIT

DUKE OF YORK:

"*. . . bear you well in this new spring of time*
Lest you be cropped before you come
to prime." KING RICHARD II, V, 2.

On April 1, daylight is about 3 hours 40 minutes longer than it is at the time of the winter solstice. The average temperature has increased from 26 degrees in December to 53.4 degrees in March. Precipitation can be expected to be about 3 inches during the month. These three conditions of greater amounts of light, heat, and moisture trigger the annual rebirth of life in woodlands of the Chicago area and other temperate climates.

The Museum's featured exhibit for April—a habitat group portraying a mixed hardwood forest along a small stream in spring—represents a scene such as may be found in Cook County forest preserves and a number of spots in the vicinity of Chicago. In the group, above a carpet of colorful wild flowers, shrubs and forest trees are beginning to expand their leaves. Sugar maple, white oak, basswood, elm, ash, and black cherry send trunks high and spread their branches wide so that when fully clothed with leaves a canopy of foliage will subdue the light falling on living things below.

"Lest you be cropped before you come to prime" poses a major problem for all living things. The precocious behavior of early spring flowers is their partial solution to the problem. By getting an early start, low-growing plants on the forest floor can develop leaves, flowers, and mature seeds before their tall neighbors, the trees with their leafy crowns, reduce the amount of available light below the optimum for vigorous growth of plants at the lower level. Thus spring wild flowers accomplish in a few months a full life cycle that assures continuation of the species.

The woodland is a complex community of a wide variety of living things. The inhabitants run the gamut of organisms from viruses and bacteria to orchids, and from protozoans to mammals and birds. From deep in the soil to the tops of the trees and beyond, a myriad of living forms with differing degrees of independence seek a means of livelihood. What each does in this pursuit affects the lives of others. The primary source of food for all life is the green plants and, of course, the primary source of energy for plants is the sun. The capture of this energy and its distribution by food chains throughout the intricate web of life in a woodland or any other association of plants and animals anywhere is a marvel of complexity. To discern, understand, and explain it is the difficult task of the biologist. To appreciate its harmonies and rhythms is the privilege of all.

The study of living things in a particular habitat has been likened to a kind of biological economy which, like political economy, seeks to make intelligible the relations of producer, dealer, and consumer. In every community, self-sufficiency, mutual dependence, and predation result in a kind of wavering balance, the external manifestations of which are sometimes a delight to the human observer. It is against this backdrop that we see spring wild flowers not distributed at random over the forest floor but each kind in a spot best satisfying its preference for moisture or soil or simply living room. Bluebells, blue-eyed Marys, and buttercups grow close to the stream and in low portions of the wood where there is more moisture. By contrast, Mayapples, wild geranium, and wild blue phlox occupy drier elevations. More ubiquitous are the trilliums, dog-tooth violets, and anemones.

Lovely as they are, their beauty is augmented in the eyes of man by the very forces that stir plant life each year from winter's imprisonment in seed, bulb, tuber, and trunk.

During April, prints of spring flowers from Thornton's famed "Temple of Flora" series will be displayed in Stanley Field Hall to direct attention to the month's featured exhibit—the Illinois Woodland in Spring habitat group—which is permanently located in Hall 29.

JOHN R. MILLAR

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

CHICAGO NATURAL HISTORY MUSEUM

Bulletin

Featured Exhibit for May

THE MUSEUM'S NEW HALL OF POLYNESIAN AND MICRONESIAN CULTURES

Vol. 32 *No. 5*
May *1961*

Hei-Tiki : New Zealand

A PANORAMA OF

THE Museum's new Hall F, "Cultures of Polynesia and Micronesia," features objects from the famed Fuller Collection acquired by the Museum in 1958. Pictured are some of the outstanding pieces now on display.

HAWAIIAN ISLANDS—In 1778 when Captain James Cook, the famous English explorer, arrived in Hawaii he was thought to be a god. He was taken to a temple where natives worshipped him before an altar flanked by two idols—the one pictured here and its mate now in the Bishop Museum in Honolulu. Following the discovery of their islands by Cook, the Hawaiians were in close contact with the English. In 1824 King Kamehameha II and his queen paid a state visit to England. There they became ill with measles, a disease unknown in the islands. This so-called "children's disease" proved fatal and the visit ended in tragedy.

A funeral ship returned the bodies of the Hawaiian monarchs to their homeland in 1825. There, the ship called at the place where Captain Cook had been killed in a clash with natives who, if sufficiently provoked, apparently had no compunction about killing a supposed god. Nearby was a royal mausoleum filled with sacred objects, among them the two altar idols. Because the native religion was no longer strong, members of the crew were allowed to take back to England whatever they wished. The Bishop Museum idol remained in the family of a crew member until 1924, when it was returned to Hawaii. The history of the Fuller idol is unknown from the date of its removal from Hawaii until it was discovered in England in 1911.

THE PACIFIC

ROLAND W. FORCE
Curator of Oceanic Archaeology and Ethnology

MARQUESAS ISLANDS—In eastern Polynesia lies a group of eleven volcanic islands. High peaks soar skyward and lush green valleys are bisected by sparkling waterfalls. The encircling beaches reflect the blazing sun. These are the Marquesas, discovered in 1594 by a Spanish flotilla sent by Don Garcia Hurtado de Mendoza, Viceroy of Peru. Mendaña, the Commander, named the group after the Viceroy's lady, Las Islas Marquesas de Mendoza. Herman Melville in his famous *Typee* provides a vivid account of native life in these islands.

Today the population of the Marquesas has dwindled to a few thousand—the old cultural milieu is lost. No longer are beautiful artifacts made; no longer do the young desire to learn the ways of their ancestors. The Marquesans of old were renowned for the elaborate tattooing of their bodies, but their craftsmanship reached its highest development in the carving of wood and whale-tooth ivory.

Carved ear ornaments of whale ivory.

Head of a war club.

Stylized figure from a council house.

Head of a hand-weapon, decorated with feathers, dog hair, and abalone shell.

NEW ZEALAND—The native people of New Zealand are called the Maori, a Polynesian word which means "indigenous." Linguistically, culturally, and physically the Maori are Polynesian. Oral traditions tell of early migrations southwestward out of south-central Polynesia in the tenth to twelfth centuries. These first settlers in a new and different land came in huge double-hulled canoes. They stayed on in their new homeland, multiplying and developing new characteristics which set them apart from their cultural cousins in the rest of Polynesia. One feature of culture which came to be elaborated was wood carving.

To the Maori, art was ornamentation. He showed his skill as a woodcarver in the intricate and stylized decoration of every object he used. His weapons, tools, storage containers, canoes, and houses showed his compulsion to ornament and to create what seemed to him to be beautiful. The curvilinear designs he developed are the hallmark of Maori workmanship.

Rare type of grease or tinder container.

EASTER ISLAND—At the easternmost extremity of Polynesia, isolated between the countless islands of Oceania and the west coast of South America there is a single, lonely and barren island. It was discovered on Easter Sunday in 1722 by the Dutch explorer Roggeveen and derives its name from this event. This remote and wind-swept island with its silent volcanic cones and its huge somber statues which stare tirelessly out to sea from grassy slopes has always conveyed a sense of mystery to anthropologists. The culture of the early Easter Islanders will never be well known, but the grotesque physical remnants of a lost civilization—the statues, carvings, and strange script incised on wooden tablets—testify mutely to a way of life distinct from all others in the Pacific.

Among the unique carvings of Easter Island are images representing ancestral spirits. They are emaciated and gaunt. Their cheeks are hollow, their ribs protrude, and their obsidian eyes glint maliciously. No proper explanation has ever been offered for these bearded figures.

(*Continued on back page*)

1921
40 Years

By John R. Millar,

Then and now. Crowds trekked across a semi-wasteland to reach the Museum on the day the new building opened—May 2, 1921

MAY 2, 1961 marks the fortieth anniversary of the opening to the public of Chicago Natural History Museum's present building after the Museum had moved the year before from its first home, the Palace of Fine Arts Building in Jackson Park, erected for the World Columbian Exposition of 1893. The moving operation had been both unique and spectacular—when before had anyone ever seen the head of an elephant riding rampant on the deck of a railroad flat car? The vast collections, exhibits, and library had been transferred to a substantial, carefully designed and elegant new home that fully expressed the ideals, dreams, and best judgment of experienced museum officers and staff.

The 8,000 or more people who visited the Museum on May 2, 1921, journeyed over unpaved roads, cinder paths, and board walks to a magnificent white marble building set apart in a kind of no-man's-land. Shedd Aquarium, Soldier Field, and Adler Planetarium came much later.

On opening day, the exhibits were essentially the same in appearance as those in the Jackson Park building. Case interiors were black and crowded with specimens; exhibition labels were black with silver gray lettering. There seemed to be a vast amount of space, and some departments fitted rather loosely in the area assigned to them. The large exhibition halls were intended for daylight illumination—there was no individual case lighting. On dark days, ceiling fixtures hardly dispelled the gloom, as the black case interiors absorbed all available light.

But almost as soon as the spacious building was occupied, a new and vigorous growth began. A period of unusually active expeditionary and field work in all departments was made possible by an enlarged scientific staff and the generous financial support of a number of individuals, especially Mr. Stanley Field, President, Mr. Marshall Field III, and other trustees of the Museum. Central and South America, Africa and Asia, as well as various areas of the United States and subarctic Canada, were the locale of numerous expeditions that resulted in large scientific collections as well as specimens for exhibition. This accelerated program in all Museum activities—research, publication of scientific reports, exhibitions, and education—has continued to the present.

Along the way, numerous changes have been made in the physical plant, in storage facilities, and in exhibits. The ground floor, which was largely unfinished in 1921, was made into exhibition halls, storage, and work areas. With the exception of Stanley Field Hall, all skylights in the exhibition halls were covered and nearly all windows closed. Exhibit cases were then individually lighted.

The continuing effort of the staff to improve the content, organization, and appearance of exhibits has produced many changes. There is no exhibition hall in the Museum that has not been renovated at least once since opening day; some have been completely revised

-1961: Recalled

ief Curator of Botany

and reinstalled several times. The result has been the creation of a number of exhibits for which the Museum is world-famous: Malvina Hoffman's life-size sculptures in bronze showing the races of mankind; the eight dioramas of Stone Age man; the hall showing Indian America before Columbus, which started a trend in exhibition that has influenced practically every museum in the country; the world's finest exhibition hall of reptiles and amphibians, made possible by techniques of mounting developed at Chicago Natural History Museum; the collection of murals of prehistoric animal life painted by Charles R. Knight; the hall of fossil vertebrates featuring the 72-foot Brontosaurus skeleton; the reconstruction of a Coal Age forest of 240 million years ago; the development of some of the finest botanical exhibits to be found in any museum in the world; and habitat groups of animals in naturalistic settings equal to the best that can be seen anywhere. This program of change and development is going on now—witness the new Hall of Polynesian and Micronesian Cultures opening on April 29 of this year—and may be expected to go on indefinitely.

Anniversaries invite forward as well as backward glances. The slogan of the fiftieth anniversary of the founding of the Museum in 1893 was "A living museum is a growing museum." Growth in a museum implies change, certain kinds of institutional "growing pains," and the outmoding of vesture. A living natural history museum is never finished. It serves its community and the natural sciences as no other social institution can, and to continue this service is the purpose and function of Chicago Natural History Museum.

Editor's note: Mr. Millar joined the staff of the Museum February 1, 1918, and has personally witnessed the changes of which he writes.

MUSEUM NEWS

Free Concerts Festival

Benny Goodman and Leon Fleisher will be among the featured guest artists in the Mozart-Schubert Music Festival (May 2–4) that brings to a climax the Free Concerts Foundation's 1960–61 season in James Simpson Theatre. Additional artists will be Saramae Endich, soprano; Leslie Parnas, cellist; Sidney Harth, violin; and other members of the Festival String Quartet assisted by Warren Benfield, bass viol.

All festival concerts are scheduled to begin at 8:30 P.M. Performing at the first concert, on Tuesday, May 2, will be Leon Fleisher, Leslie Parnas, and members of the Festival String Quartet. They will play the Arpeggione Sonata and the "Trout" Quintet by Schubert, as well as Mozart's G minor Piano Quartet.

The Wednesday, May 3, concert will be a violin-piano sonata recital by Sidney Harth and Leon Fleisher.

Benny Goodman highlights the Thursday, May 4, concert, along with Warren Benfield, Saramae Endich, Leslie Parnas, and members of the Festival String Quartet. The program will include Mozart's Clarinet Quintet and songs for soprano; and two Schubert selections.

Tickets may be obtained by sending a self-addressed, stamped envelope to Free Concerts Foundations, Chicago Natural History Museum, Roosevelt Road and Lake Shore Drive, clearly indicating the number of tickets and the concert, or concerts, desired.

Longer Museum Hours

Beginning May 1 the Museum will be open from 9 A.M. to 6 P.M., seven days a week.

New Staff Member

Joanne L. Evenson has joined the staff of the Raymond Foundation. A graduate of the University of Wisconsin, Miss Evenson's major field of study was geology. She will assist with the programs and tours for school children and adults, and will take part in all other Raymond Foundation activities.

Chicago Natural History Museum
Founded by Marshall Field, 1893
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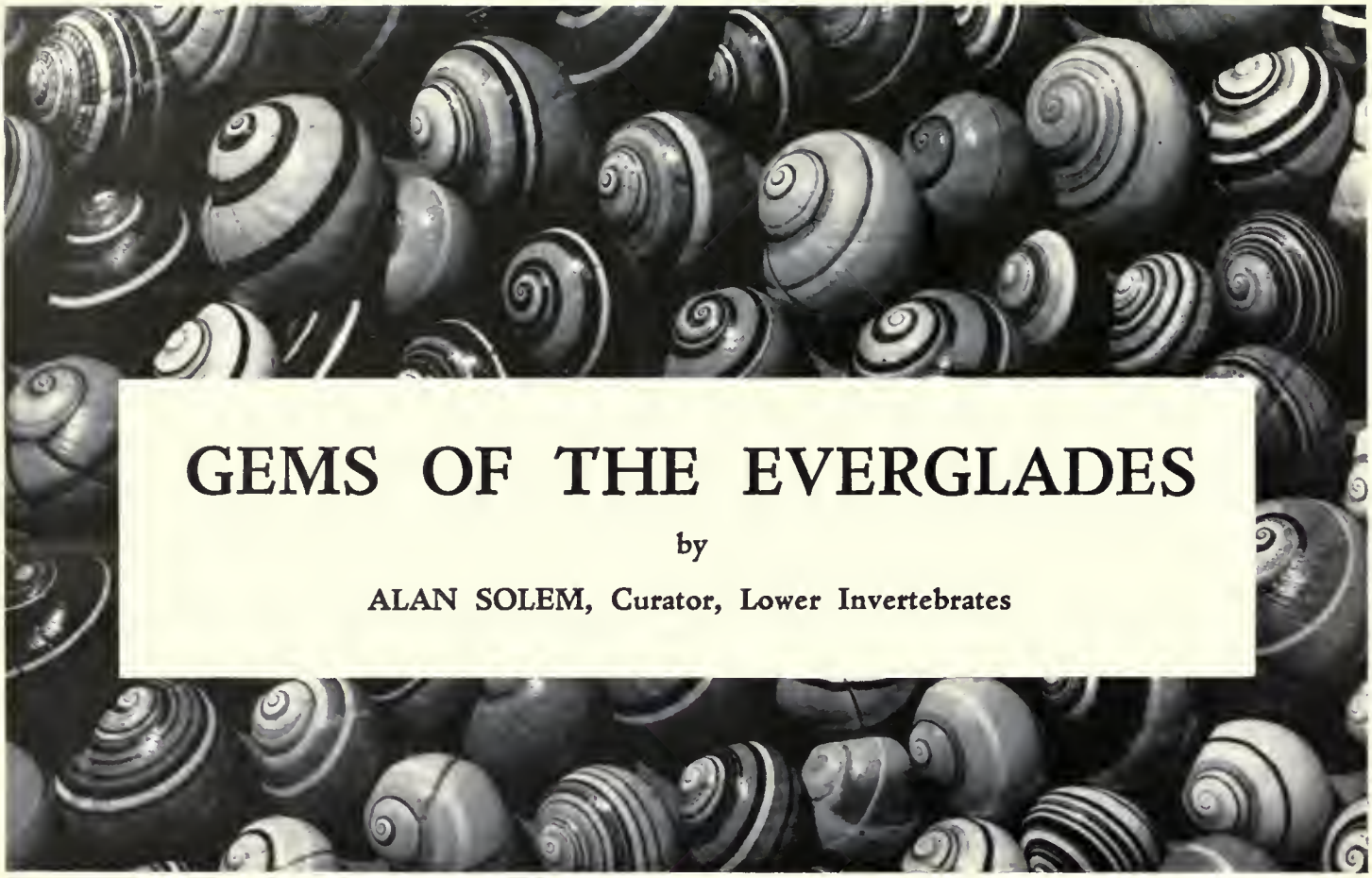
Exhibit of Children's Art

An "exhibit on exhibits" will be presented by the Museum during May when paintings, drawings, and prints inspired by Museum displays and created by students of the Junior School of the Art Institute will be featured in Stanley Field Hall. Seventy-six students will be represented in the display.

The imaginative art work to be shown in the student art show represents the efforts of children as young as five years old and up through the teens. Throughout the year the Art Institute holds classes in the Museum, where the students have an opportunity to study plant and animal structures, forms of primitive art and design, and art techniques of ancient civilizations. The student art work will remain on display May 1–31.



GEMS OF THE EVERGLADES

by

ALAN SOLEM, Curator, Lower Invertebrates

EXTREME SOUTH FLORIDA is a vast expanse of saw-grass marsh studded with isolated atolls of hardwood hammocks—small clusters of trees on land rising only a few inches above the water's surface. Inward from the ocean shore, mangrove swamps gradually merge into drier hardwood jungles, both on the mainland and along the chain of islands from Largo to Key West. On these dots of dry land live snakes, biting insects, birds and beautiful tree snails.

These snails, of the genus *Liguus*, feed on fungi, preferably scraped from the bark of the wild tamarind or Jamaica Dogwood, although they are sometimes found on other smooth-barked trees. Several color forms of these snails may live in the same hammock, although sometimes only pure colonies are found. A few variations that live only on one small hammock are now extinct because bulldozers leveled their sole habitat when clearing the land for housing developments.

It has been said that *Liguus* collecting (called "ligging" in Florida) combines the "pleasures of an Easter egg hunt with the dangers and thrills of exploration in tropical jungles." For Dr. and Mrs. Michael Price de Boe of Coral Gables, Florida, "ligging" meant the joy of being close to nature, seeing alligators, flowers, and butterflies, and enjoying a change from everyday activities in the company of friends with similar interests. Each specimen held memories of a day's hike, a new exploration. The de Boe's were keen snail hunters, eager to find out which snails lived on the next hammock. Over the years, 365 "next hammocks" were explored. Careful records and maps were kept and each shell collected was marked with the locality, date of collection, and a catalogue number. The name *Liguus fasciatus solisoccasus* de Boe, given to one of the snails they discovered, stands as a testimonial to their explorations and study of these mollusks.

Through the generosity of the late Dr. Jeanne S. Schwengel of Scarsdale, New York, Chicago Natural History Museum has just acquired the famous de Boe collection. Its 12,500 specimens, representing every known color variation of Florida *Liguus* and nearly every variety known from Cuba and Haiti as well, constitute probably the finest assemblage made by private individuals. The bright yellows, blues, browns, greens, pinks and whites of these 2½ inch shells are subtly combined into myriads of patterns coated with a high gloss. It is no wonder that they are called "gems of the Everglades" by South Florida residents.

The beauty of the shells and the challenge of the hunt explains their fascination for collectors, but what is the importance of *Liguus* collections to museums, and why do these snails have such interest for scientists? There are only four or five species of *Liguus*, although 55 color forms have been named from Florida and possibly another 50 from Cuba and Haiti. The answer lies not in their numbers, but in the way they live and the evidence they offer of evolutionary processes.

During the rainy season of May through August the snails move about on their food trees, feed, add to their shell and, near the end of this period, mate. About October 1st, any brief

shower will serve to trigger egg laying. The snails crawl down the tree trunk, dig a small hole in the leaf mold at the tree's base, lay and then cover 15 to 50 pea-sized eggs that remain in the soil until spring. The adults then ascend the tree and seal themselves with an internally secreted cement to a limb or under loose bark, there to remain dormant until the rains return. This cement is very strong, and if the shell is pulled by a collector the bark or shell may break before the glue loosens. When wet weather returns, the snails dissolve their seals and resume activities.

The eggs hatch in the spring and the young immediately crawl up the nearby tree and begin feeding. Many young die during droughts or are eaten by birds. Those that survive attain adulthood in four years and may live as long as nine. Occasionally raccoons, rats, or opossums eat adult snails, and some are taken by collectors, but their greatest enemy is the encroachment of housing and industrial developments.

The snails seldom move out of their trees, can remain sealed to a limb for nine or ten months, and can be submerged in water for 20 hours without harm. They have been observed to descend trees *en masse* before the start of a severe hurricane, with a less dramatic descent preceding a milder storm. How they sense the impending storm is unknown. Occasionally, some specimen sealed to a tree limb will be carried great distances by high winds. If the broken limb lands in a hammock and the snail is not destroyed, a new colony may possibly be started.

In this possibility lies the key to the scientist's interest.

Untold millennia ago, such a tree limb must have blown or drifted across the water from Cuba to southern Florida. Beached on the edge of a hammock, the first Florida *Liguus* reproduced. At rare intervals, other such accidental introductions spread *Liguus* across southern Florida. Genetic mutations produced new color variations in isolated hammocks. Sometimes these colonies were wiped out by fire. Occasionally two forms reached the same hammock and hybridized. With small original populations and only occasional interchange of individuals between colonies, the opportunity for new color variations to be preserved was great. Thus the multitude of color forms originated and persisted. Here is almost a classic type of differentiation in minor characters among populations of one species.

Nature has produced a vast pool of pure populations that vary in minor ways. Collections such as that made by the de Boes give us a census of where and when certain color forms exist. From this pool of information, experimental biologists can select different strains (color forms) for experimental breeding. By collecting young individuals from known areas, crossing different varieties, and comparing the progeny with the original patterns, we can eventually hope to learn how color pattern is genetically controlled, thus adding to man's knowledge of the mechanics and course of evolution.

Above: *A shuffleboard pole and a "plumber's helper" assist Erwin Winte's "ligging" operation.*

Upper Left (*title background*): Polymita *snail shells from Cuba's Sierra Maestra—like* Liguus *shells—are among the most varied and brilliant known.*

A recently developed technique yields new information on environmental changes affecting prehistoric Indians of the Southwest

THE ARCHAEOLOGY *of* *Environmental Change*

James Schoenwetter, Field Assistant
1960 Southwestern Archaeological Expedition

WHAT would the people of Chicago do if the present climatic boundaries within the United States were to shift ten degrees latitude to the north over the next twenty-five years?

Would we meet the challenge in the same way as the prehistoric Indians of the Southwest, whose struggles to adjust their patterns of living and to survive in a rapidly changing climate have recently been reconstructed by Chicago Natural History Museum archaeologists?

These are not idle speculations, since some scientists believe that a northward movement of climates is taking place now. If this is the case, Chicago, which was once buried beneath a great glacier but today has a temperate climate, may gradually grow warmer. While we would enjoy milder winters, the corn and wheat belts of the Midwest would shift to different locations. Michigan and Minnesota farmers would begin to grow more corn, while farmers in central Illinois would be planting cotton. In a few years grain elevators in Kansas would be nearly empty, while new elevators would have to be built in Montana and North Dakota. Many industries that depend on such natural products as lumber or cotton would be far from their sources of supply; our railroads would be concentrated in the wrong places; our towns and villages cut off from their economic bases; and more of our nation's land would become arid waste.

Just as we recognize that environment plays an important role in the life of contemporary people—whether civilized or primitive—so we know that it must have influenced man's life in the past. Recently, the Museum's Department of Anthropology has been investigating the effect of environment on the lives of prehistoric Indians in the southwestern part of the United States. We are trying to discover what climate these people might have lived under, whether that climate changed, and, if so, what the people did about it. For if a climatic alteration would create hardships for our society, with all its intricate technological knowledge and skills, there is little doubt that a group of Indians living in an adobe pueblo in thirteenth century Arizona would have a more difficult time adjusting to change in their surroundings.

There are a number of techniques that scientists may use to uncover information about prehistoric environments. The most widely utilized is the interpretation of geological information. Through observation and study of the broad, flat plain that extends from northern Canada to central Illinois, the deep basins of the Great Lakes, and the moraines stretching across the center of the continent, we conclude that at one time a great sheet of ice must have been present in these latitudes, which ground the earth's surface flat, gouged out the Great Lakes, and deposited the terminal moraines.

Another technique is the interpretation of animal remains. At a village site several miles from the present course of a river many clam shells, fish and waterfowl bones, and shells of aquatic snails may be found. We infer that at one time the course of the river must have been nearer to the site than at present.

There is yet another major technique: the interpretation of ancient plant remains. This has generally been applied to such materials as seeds, fruits, twigs, and leaves, but these are rarely preserved in sufficient quantity to be useful. Since plants are quite good indicators of environment, as any of us will realize if we travel from the temperate forest area of Illinois to the arid deserts of the Southwest, the lack of such plant remains has been a hindrance to prehistorians.

Less than fifty years ago a Scandinavian scientist, Lennart Von Post, discovered a new type of plant fossil—ancient pollen grains. It had been known for some time that the pollen of plants is distinctively shaped and sculptured so that it is possible to differentiate between genera of plants (for example between pine, spruce, fir, oak, ragweed, and morning-glory) merely from an examination of the pollen grains. The next step was the discovery by Von Post that pollen grains buried in sediment over thousands or millions of years of geologic time sometimes were perfectly preserved and could be identified as readily as pollen that was fresh and new. But pollen grains are microscopic, the largest being about two-tenths of a millimeter, so methods had to be devised for separating the pollen from the sediment so that the fossil grains could be observed through the microscope.

Present techniques of pollen extraction are based upon the knowledge that pollen grains are highly resistant to chemical decomposition. In fact, pollen will not dissolve in any of our most powerful acids or bases, and since it does not dissolve chemists have not yet determined the exact chemical composition of this material. We extract pollen from sediment, then, by chemically decomposing the sediment and leaving the pollen behind. As an example, many sediments contain calcium carbonate, the mineral which causes boiler scale. Hydrochloric acid dissolves this mineral, much as sugar dissolves in a cup of coffee. By adding this acid to the sediment and then spinning the soupy liquid in a centrifuge we can force the undissolved material to the bottom of a test tube and pour off the

acid with the dissolved mineral. Then we add another acid which will dissolve another mineral, then still another, and so on until the original sample is reduced nearly to pure pollen.

As soon as these methods were perfected, archaeologists in northern Europe began to collect sediments associated with archaeological sites and to subject them to pollen analysis.

But on this continent the value of pollen analysis was slower to be recognized. Most European pollen samples came from organic sediments, such as peat and lake muck, but there are few impressive archaeological sites located in such sediments on this side of the Atlantic. After World War II, when techniques began to be developed for extracting pollen from inorganic sediments like silt and clay, American archaeologists became more interested in the potential of the method. Chicago Natural History Museum is among the first institutions in the United States to apply the technique of pollen analysis directly to archaeological sites. Operating under a joint grant from the Museum and the National Science Foundation, the 1960 Southwestern Archaeological Expedition began pollen research in eastern Arizona and western New Mexico last summer.

As pollen analyst for the Southwestern Expedition I spent a month at its headquarters near Vernon, Arizona, working in close harmony with Dr. Paul S. Martin and Dr. John Rinaldo collecting sediment samples from archaeological sites that they had investigated for the Museum over the past twenty years. I then utilized the facilities of the Geochronology Laboratories of the University of Arizona at Tucson to process the samples and extract the pollen. Since my return to graduate work in the Department of Anthropology at Southern Illinois University, I have continued to work on the problem of pollen analysis.

The research program is still far from complete, but results are already beginning to be evident. The environment under which the early inhabitants of the Southwest lived is gradually becoming known to us. We have discovered corn pollen in pithouses that were built before the time of Christ, which indicates that these early peoples practiced agriculture. We have evidence that the contemporary forests of pine and juniper which are now extensive in western New Mexico were not so vast 1500 years ago; and that a certain area in eastern Arizona which is now treeless was once forested. And we have learned that the inhabitants of one thirteenth-century site near Springerville, Arizona, were forced to change their economic pattern from agriculture to hunting, in the relatively short period of 75 years. This alteration in the economy of these people was perhaps not the result of a drought, as formerly postulated, but of a change in the seasonal pattern of rainfall.

In support of this hypothesis, it was discovered that when the pueblo was first built its inhabitants obviously depended a great deal upon corn agriculture, for about 50 per cent of the pollen found was of corn. The presence of other pollen types also indicates that the Indians were living near a swampy area that would furnish plenty of water for corn growing. However, the amount of corn pollen found decreased, with the passing of time, to five per cent of the total, while the pollens of the swamp-favoring cattail and sedges disappear from the record and are replaced by pollen from plants that indicate conditions of sediment disturbance. Apparently, the swamp was beginning to drain away as the river which fed it cut its bed deeper and lowered the water table. It is difficult to understand how a drought could make a river cut its bed more deeply, since there would be less water to do the cutting. More likely, there was an increase in the number of torrential summer rainstorms whose fast-rushing run-off waters caused the river to erode the sand and silt of the stream bed. The corn crop, no longer semi-irrigated by the easily diverted waters of the swamp, became less dependable as a food supply.

How did the Indians respond to this change? They could have moved away from the area, but they did not. Perhaps they thought they were having just a run of bad luck and that good times would return. In any case they filled in their pueblo and constructed a new pueblo on top of the old one, possibly for religious reasons connected with the reduced corn supply. But the pollen from the new pueblo shows that the environment did not improve. After living in their new home for a long time, subsisting more and more on game and wild foods, with an occasional successful corn crop, they finally abandoned the site and never returned.

Author Schoenwetter at work in his laboratory at Southern Illinois University.

Thus these thirteenth-century Indians reacted to climatic change by changing their economy from agriculture to hunting while clinging to their home as long as they could. What, I wonder, would *we* do?

Detail of the carving on a paddle-club.

FIJI—The Fiji Islands are situated on what is generally considered to be the border line between Melanesia and Polynesia. For this reason Fijian culture is a blend of features from both major culture areas. The people of Fiji share many customs with other islanders. They make bark cloth and drink kava. Some practices, however, set them apart. Among Fijians the art of war was especially developed and their propensity to indulge in cannibalism has become widely known.

The forest lands of Fiji possess an abundance of hard and soft wood timber. From this ready stock of raw materials Fijian craftsmen produced a wide range of wooden artifacts. Among these are elaborate war clubs of huge proportions. Long and bulky spears with complicated barbs were shaped perhaps as much to frighten opponents as to harm them. The rough stone adzes used to produce wooden objects seem crude and difficult to manage, but they served well in the hands of the dedicated artisan. Some weapons display intricate incised geometric designs, the meaning of which only the carver knew. Others include small stylized human and animal figures which depict a battle scene or a turtle hunt.

Head of an axe-bit club.

THIS MONTH'S COVER

Pictured on the cover is one of the finest products of Maori workmanship—a neck ornament ("hei-tiki") made of nephrite greenstone. It is one of the three largest ornaments of its kind known to exist and is remarkable for the excellence and delicacy of its form. This outstanding artifact was a gift to the Museum from Captain and Mrs. A. W. F. Fuller of London, England, and may be seen in the new Hall F.

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CHICAGO NATURAL HISTORY MUSEUM

Bulletin

YOUNG ARTIST'S IMPRESSION OF DINOSAUR EXHIBIT

VOLUME 32

NUMBER 6

JUNE 1961

NEWS *from* CHICAGO *NATURAL HISTORY* MUSEUM

Acquisition

Dr. Clifford C. Gregg, Director, accepts prehistoric pottery vessel from Veraguas Province, Panama—a gift to the Museum's Department of Anthropology from the National Museum of Panama. Presentation is by Mrs. Angela Munoz de Lew, Consul-General of Panama in Chicago. Ceremony took place during Pan-American Week (April 8–14), when the Pan-American Council honored sixty-eight years of scientific cooperation between Chicago Natural History Museum and the countries of Latin America. On the table in the photograph are a few of the many hundreds of publications by Museum scientists reporting their research on the anthropology, botany, geology, and zoology of various Latin American countries.

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Spotlighting the Museum's Photographers

We have received a number of inquiries about the source of the remarkable photographs of the Fuller Collection appearing in last month's pictorial feature, "A Panorama of the Pacific." The Museum staff members responsible for these outstanding photographs of South Pacific artifacts are Mr. John Bayalis, Photographer, and Mr. Homer V. Holdren, Assistant Photographer, who together with Miss Mary Creed comprise the Museum's Division of Photography. BULLETIN readers have long known them as the source of the striking cover photographs for which the periodical is noted. It is less well known, however, that Mr. Bayalis and Mr. Holdren also supply a large percentage of the photographs of the Museum and its activities that appear in the Chicago and nationwide press. Their most recent work forms an integral part of the Museum's new Hall of Polynesian and Micronesian Cultures (Hall F, ground floor), and adds an important dimension to the visitor's appreciation of the art objects displayed in the hall.

This Month's Cover and a New Museum Journey

Dinosaurs will be the focus of an all-out hunt during the months of June, July, and August when the Museum offers youngsters a new summer Journey, "Dinosaur Land." Equipped with detailed travel instructions and special "weapons"—pencils or pens and Journey questionnaires—hundreds of children will set out through the Museum's halls for a trek back through time as far as 175 million years when animals weighing more than 30 tons roamed the earth.

All children are invited to participate in the Journey and may obtain travel instructions and question sheets at the information desk and the north or south entrances. When completed, the questionnaires should be turned in at the doors for credit leading to Museum Journey awards.

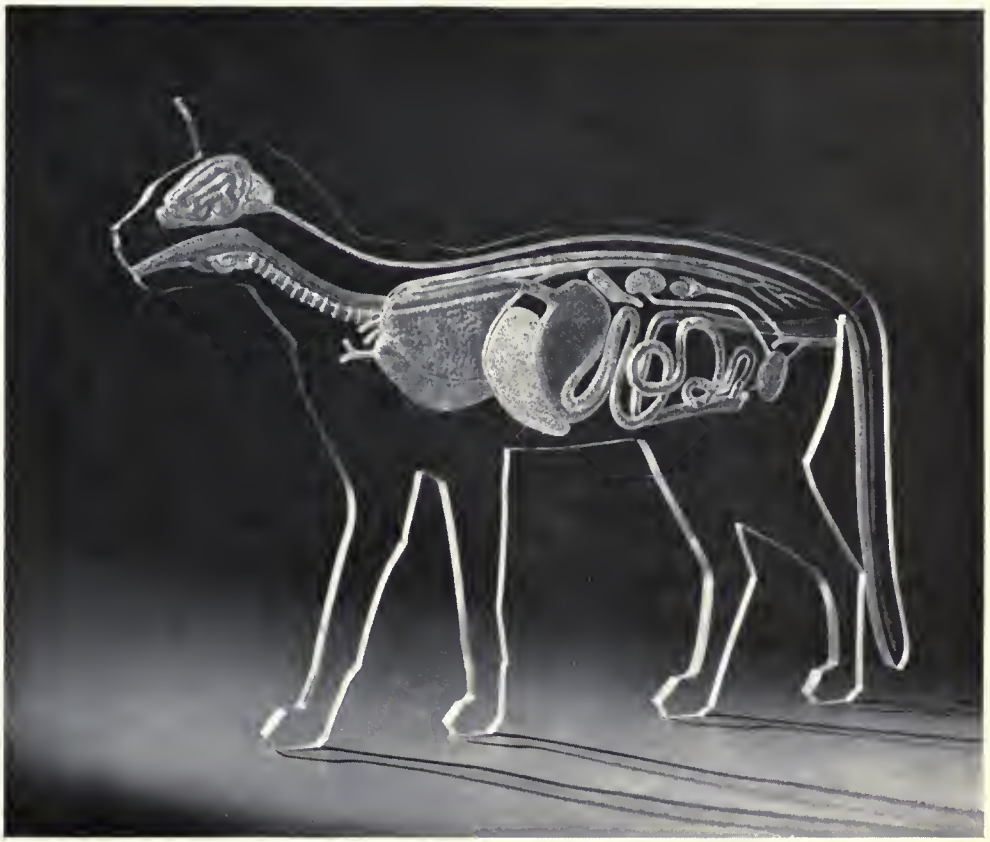
Already ahead of the other "hunters" is Nancy Ninke, 15, a young student at the Art Institute. She early found these prehistoric giants of absorbing interest, as evidenced by her pen and ink drawing of the Museum's Gorgosaurus exhibit, which appears on our cover. Her drawing was displayed in the Museum during May as part of the annual student art exhibition of the Junior School of the Art Institute.

(*Continued on page 4*)

"THIS IS A MAMMAL"

Featured Exhibit for June

Philip Hershkovitz
Curator, Mammals



"THIS IS A MAMMAL" is the title of June's Exhibit-of-the-Month in Stanley Field Hall. The display is the first completed in a series being prepared for a redesigned Hall of Mammals.

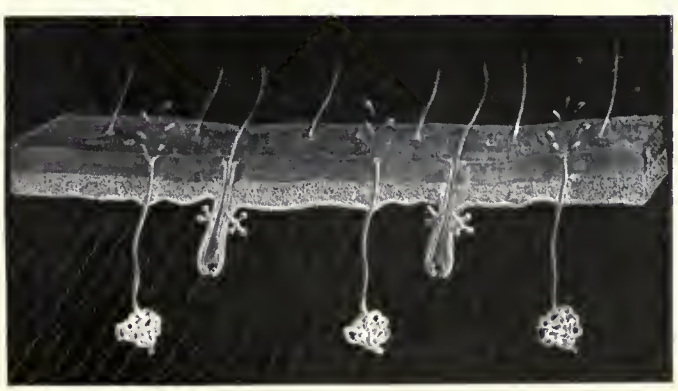
The exhibit uses actual specimens, models, drawings, and text to illustrate the distinctive anatomical characters of mammals and to show how mammals differ from all other animals. Some of the outstanding mammalian features are the nourishment of young with milk produced by the mother, the facial muscles developed primarily for suckling, the body covering of hair, the four-chambered heart with the main artery on the left side, and the muscular diaphragm which separates the lungs from the general body cavity.

Among the most important characters of mammals, certainly from the point of view of zoologists concerned with the earliest creatures of the kind, are those found in the hard parts, which may be preserved as fossils. The differences between living mammals and other living animals are many and clear. The distinction between mammals and the extinct mammal-like reptiles from which they evolved more than 160 million yeas ago rests primarily on the structure of the lower jaw and the way it hinges on the skull.

The lower jaw of a mammal consists of a single bone, the dentary. The reptilian lower jaw is made up of the dentary and a number of other bones including the articular, which hinges with the quadrate of the upper jaw. In mammals the dentary itself hinges directly on a bone of the brain case, the squamosal.

Somewhere along the evolutionary line from reptiles to mammals these two little hinge bones of the reptilian jaw found a new place and function. Still jointed, the reptilian articular and quadrate bones moved into the middle ear and, joining the stapes, became the mal-

(*Continued on page 8*)



Above: *The chief internal organs of a typical mammal. The model, sculptured in plexiglass that reveals the internal parts in color, shows the normal position of the brain, heart, lungs, and other organs which are displayed separately on the exhibition panel.*

Left: *Skin glands of mammals. A greatly magnified section of skin shows hairs, the oil glands around their base, and the sweat glands which help maintain an even body temperature.*

ABOVE (Zoology): Members' Night visitors examine some "facts and fables about abominable snowmen."

Members' Night

Members' Night, 1961, saw 1,725 persons stream through the Museum's doors for an evening of intellectual stimulation and enjoyment. They talked with the Museum's scientists, learned something of their research, and glimpsed the varied behind-the-scenes operations that are such an important part of the Museum's functioning. Carrying articles purchased in the Mexican market place, our guests lingered before the demonstrations and exhibits prepared for them on the third and fourth floors of the Museum, and examined the treasures now on permanent display in the new Hall of Polynesian and Micronesian Cultures.

Many visitors wrote to express their pleasure in the evening. As one couple put it: "It is difficult to say what one subject was the most enjoyable, or gave the greatest pleasure. Having seen the film showing what goes on behind the scenes at the Museum and what efforts are made to produce a leaf which is authentic, it will be with great humility and deeper appreciation that we shall view the exhibits in the future." Another member wrote: "The staff of the Museum should be congratulated for the exciting program. It was the first Members' Night my children and I have attended. We want to come back every year as well as in between." One happy youngster addressed his note to Dr. Fritz Haas, Curator Emeritus of Lower Invertebrates and a member of the Museum's staff for 23 years:

> "Dear Dr. Haas,
>
> Thank you for giving me those very wonderful shells you gave me last night. All together my shells weigh two pounds. . . . I was 7 December 30th. I like to go to Members' Night. I hope to see you next year."

For these and the many other expressions of appreciation received, the Museum's staff is deeply grateful. In reply, Dr. Haas has summed up the feelings of all of us in his own apt comment: "All the work, the trouble, the preparations that are a staff member's lot before Members' Night were highly rewarded!"

Lapidary Exhibit

Approximately 100 outstanding examples of amateur gem and jewelry craftsmanship will be displayed at the Museum from June 10 through July 4 in the Eleventh Annual Amateur Handcrafted Gem and Jewelry Competitive Exhibition.

The exhibition, sponsored by the Chicago Lapidary Club, will include prize-winning cabochoned and faceted gems, gem collections, individual pieces of jewelry and jewelry sets, polished stone and slab collections, and enameled stone work. The exhibitors are amateur "lapidarists" residing in the Chicago metropolitan area.

Television Program

WTTW's new "Festival" program series on Channel 11 will feature Dr. Roland Force, Curator of Oceanic Archaeology and Ethnology, on Friday, June 29 at 9:30 P.M. The program will highlight the Museum's newest exhibition hall, "Cultures of Polynesia and Micronesia," devoted to the art and customs of the peoples living in those areas of the South Pacific. Through the use of photographs, paintings, music, and the display of outstanding objects from the Museum's collections, Dr. Force will recreate the life and culture of Polynesia and Micronesia. Dr. Force has lived in the South Pacific, and has done anthropological research there. "Festival" is a weekly series on Chicago's educational television station, designed to call attention to the cultural life of the city by focussing on outstanding personalities and events promoting culture and the arts in Chicago.

Lectures and Meetings

Dr. Clifford C. Gregg, Director, and Mr. E. Leland Webber, Assistant Director of the Museum, attended the annual meeting of the Association of Science Museum Directors at Cranbrook Institute of Science, Bloomfield Hills, Michigan, on May 23. Dr. Gregg introduced the panel discussion on "Problem of Sportsman Collections for Museums."

Dr. Gregg also attended the annual meeting of the American Association of Museums held in Detroit May 24–26 at which he was one of three panel speakers on the subject of "Federal Support of Museums." Other staff members attending the meeting of the Association included Mr. E. Leland Webber, Assistant Director, Mr. John R. Millar, Chief Curator, Department of Botany, Miss Miriam Wood, Chief of the Raymond Foundation, Dr. Roland W. Force, and Mr. Allen S. Liss, Custodian of Collections, Department of Anthropology.

Dr. Rainer Zangerl, Curator of Fossil Reptiles, was recently selected by the American Geological Institute to participate in its "Visiting Geological Scientist Program," through which eminent geologists from larger institutions are brought to the campuses of smaller colleges and universities to lecture and to confer with the faculty on curricula, departmental organization, and expansion. Dr. Zangerl visited the West Texas State University (Canyon, Texas) and Brigham Young University (Provo, Utah).

Dr. Louis A. Williams, Associate Curator of Central American Botany, attended the annual meeting of the Society for Economic Botany held in Boston. He also visited the Gray Herbarium at Harvard University and the National Museum's herbarium in Washington, D.C., where he checked his manuscript for the next part of the publication, *Flora of Guatemala*, against specimens in the collections of both institutions.

Ohio State University was the site of a recent gathering of American anthropologists and archaeologists attending the annual meetings of several scientific organizations held on that midwestern campus. Among those participating were Dr. Paul S. Martin, Chief Curator of Anthropology; Dr. Roland Force, Curator of Oceanic Archaeology and Ethnology; and Mr. George I. Quimby, Curator of North American Archaeology and Ethnology. Two papers were presented by the Museum staff, one by Mr. Quimby on "Protohistoric Indians of the Upper Great Lakes Region," and the other by Dr. Force entitled "Palauan Paradox: Some Comments on Kinship Terminology." Another recent paper by Dr. Force, also based on his research on the Palauan language, appeared in the April 21, 1961 issue of *Science*. Entitled "Keys to Cultural Understanding," the paper discussed the relation of figures of speech to fundamental modes of perception. At the Ohio meetings, Dr. Force was elected first vice-president of the Central States Anthropological Society.

(*Continued on page 8*)

LEFT MIDDLE (Anthropology): Dr. Hoshien Tchen, consultant on the Museum's East Asian Collection, demonstrates Chinese brush writing for a fascinated group.

RIGHT MIDDLE (Geology): Mr. David Techter, Museum Assistant in Fossil Vertebrates, explains some interesting facts about a fossil duck-billed dinosaur being prepared for exhibit.

BELOW (Botany): A reconstruction of a fossil plant that lived more than 150 million years ago, the giant Cycadoidea, also attracted many Members.

(Except where other credit is given, photographs in this issue are by the Division of Photography.)

New Fossil Fishes from Wyoming

Museum paleontologists have discovered the oldest ancestral relatives of a modern "living fossil"—the lungfish

ROBERT H. DENISON
Curator, Fossil Fishes

Nearly 400 million years ago the Devonian sea overflowed the margins of the western geosyncline and spread over the flatlands of what is today Wyoming, Utah, and Idaho. Near the margins of this advancing sea and in streams emptying into it lived a variety of fishes that would appear strange to our modern eyes. The commonest of these were armored fishes, including weird jawless ostracoderms, and jawed fishes, called arthrodires, that are distantly related to sharks. This fish fauna, one of the earliest that is known at all adequately, has been the object of Museum expeditions in 1950, 1953, and 1959 to western states. It has been found in sediments deposited in estuaries and bays of the advancing sea in a few localities in Wyoming, northern Utah, and southeastern Idaho.

In 1953 a geology student of the University of Wyoming discovered a new locality in the Bighorn Mountains of Wyoming, and while returning from our 1959 collecting trip we stopped off briefly to see it. It appeared to be very promising; in fact, it was the only locality that I had seen where the rock was easily workable, and the fossils were sufficiently abundant so that one could sit down and quarry them out. Not only that, but certain levels contained well preserved plants and eurypterids, or "sea scorpions." So I planned a return visit for 1960, with our invertebrate paleontologist, Dr. Eugene S. Richardson, to watch for eurypterids, and some younger assistants, Dave Denison, Pete Richardson, and a graduate student from the University of Wyoming, John Cutler, to do most of the heavy digging.

Our quarry was opened high on the side of a canyon, in limestones that were deposited in an ancient channel, possibly representing an estuary of the De-

vonian sea. Plates of the ostracoderms, *Protaspis* and *Cardipeltis*, proved to be so common that soon we were collecting only the best specimens. Among the scattered plates we did discover a few complete, articulated *Protaspis*, and some of these were juveniles only about three inches long. Entire specimens are most unusual in this family, and babies have not been reported before. Arthrodire plates were also common and appeared to belong to several different genera.

Besides these known forms, we found an occasional large, rounded scale with a glossy surface punctured with many minute pores; these we attributed at first to the lobe-finned fishes or Crossopterygii. Also we found one or two fragments of jaws unlike anything that I had seen before in that, instead of having teeth, the margin was provided with a continuous, highly sculptured ridge of dentine. It wasn't until we found a complete set of lower jaws that we properly identified these scales and fragments. The jaws were short, massive, and fused at the symphysis. They could only belong to lung-fishes, even though they lacked the typical tooth plates. The surface was shiny and punctate like that of the scales we had referred to "crossops," and the biting surface showed the peculiar, sculptured, dentine ridges that had puzzled us earlier.

This was an exciting find because the only other lungfish as old was a single specimen from the Hunsrückschiefer of Germany. Here we were at the beginnings of the recorded history of a group that has persisted nearly 400 million years to the present day. Moreover, it is one of the few major groups that was known from fossils before living members were discovered. Lungfishes from the British Old Red Sandstone were first described in 1828, several years before living lungfishes, *Lepidosiren* and *Protopterus*, were discovered in South America and Africa. Fossil tooth plates of *Ceratodus* were described in 1838, while the closely related living genus of Australia, *Neoceratodus*, was not found until 1870. These three living lungfishes are a small remnant of a long evolutionary history. They are archaid forms that might well be called "living fossils," much like the living coelacanths that have been caught in recent years in the Indian Ocean.

The group gets its name from the presence of lungs, which are known, of course, only in modern forms. Like other fishes, they possess gills, too, but the lungs permit them to get their oxygen from the air as well as from the water. This is often necessary in habitats of living lungfishes. Many live in tropical swamps where the water may contain so little oxygen that the fishes would die without an additional supply. Others live in bodies of water that dry up periodically, and the lungs permit them to survive until the next wet season, which they usually do buried in the mud. Burrows of fossil lungfishes are known as far back as the late Paleozoic, which means that habits similar to those of modern forms were developed at least 250 million years ago. In Upper Devonian rocks, lungfishes are associated with a peculiar armored fish that is known to have lungs because they have been preserved as fillings. Also associated is a crossopterygian fish that may have had lungs because it is close to the ancestry of land animals. These points suggest that lungfishes may have developed this characteristic feature quite early in their history, but we do not expect to find any clue to this question in our new Lower Devonian discovery.

Last summer, after we realized that there were lungfishes in our quarry, we worked with added enthusiasm. When we finished the field season, we had skulls, plates of the cheek and gill cover, shoulder girdles, and many scales—enough to fill five Museum specimen drawers. Although they are not showy specimens such as we would be apt to select for an exhibit, they will add much to the knowledge of the structure of early lungfishes.

Right now the long process of preparation is progressing slowly. The hard limestone must be removed by careful grinding or chipping, and on irregular surfaces where the rock adheres strongly, dilute acetic acid must be used to dissolve it off. Already we can see that ridged tooth plates were never developed in our form, so we can assume that

Above left: A closer view of the excavation site.

Below: A view of the Big Horn Mountains of Wyoming, looking across Cottonwood Canyon. Site of the Museum expedition's excavation is encircled.

Photographs by E. S. Richardson, Jr.

it was not ancestral to most later lungfishes. But what will it indicate about the ancestry of this group, and about its relationships to other fishes? Will the palate support the belief of most paleontologists that the lungfishes and lobe-finned fishes are closely related? Or will it favor the theory of a Swedish paleontologist that lungfishes were a widely distinct group? We may hope that these and many other anatomical questions will soon be answered as the preparation of the specimens advances and the details of their structure are revealed.

Model of a modern Australian lungfish (NEOCERATODUS) on exhibit in the Hall of Fishes (Hall O).

MUSEUM NEWS

(*Continued from page 5*)

Mr. Henry S. Dybas, Associate Curator of Insects, at the recent annual meeting of The Entymological Society of America held in Kansas City, Kansas, was elected secretary of its regional north central branch. Mr. Dybas also participated last month in meetings of the Mosquito Control Association of Illinois in Urbana.

On May 21, Mrs. Paula R. Nelson, Public Relations Counsel, spoke on Chicago's cultural activities as part of a panel on "Leisure-Time Opportunities for Senior Citizens." The panel was one of a series of programs and exhibits held at McCormick Place during Senior Citizens' Week (May 14–21) under the auspices of the Mayor's Commission on Senior Citizens.

Summer Hours

Beginning June 28 and continuing through September 3, on Wednesday, Friday, Saturday, and Sunday (days of the free Grant Park Concerts held in the bandshell just across the drive from the Museum), the Museum will be open to the public from 9A.M. to 8 P.M. On those evenings the cafeteria will serve dinner from 5:30 to 7:30 P.M. Museum hours on Monday, Tuesday, and Thursday will be 9 A.M. to 6 P.M. Through June 27 the Museum will be open seven days a week from 9 to 6.

New Staff Member

Patricia M. Williams has succeeded Martha H. Mullen, recently resigned, as Assistant Editor of Scientific Publications. Miss Williams comes to the Museum from an editorial position with the National Retail Furniture Association. She is a graduate of the University of Illinois, where she majored in English. In her present position, Miss Williams will assist Lillian A. Ross, Editor of Museum Scientific Publications.

"THIS IS A MAMMAL"

(*Continued from page 3*)

leus and incus, respectively, of mammals. These three ear bones, now transmitting sound from ear drum to brain, distinguish all living mammals from reptiles, in which there is but a single ear bone, the stapes.

Where, during the course of this remarkable transformation of jaw bones to ear bones, does a reptile become a mammal? If our new exhibit dealt only with this critical period, its title would have to be changed from "This is a Mammal" to "What is a Mammal?"

The models of the display are the handiwork of Joseph Krstolich, taxidermy is by Carl Cotton, and the design and background are by E. John Pfiffner.

Below: *Zoology Staff Artist Joseph Krstolich studies his handiwork, a house cat and her kittens modeled in clay. It will be cast in plaster before being added to the Museum's featured exhibit for June. The cat and her kittens are included in the exhibit to point out that only mammals suckle their young.*

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CHICAGO NATURAL HISTORY MUSEUM
Bulletin
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July 1961

PRIMITIVE ARTISTS look at Civilization

PHILLIP H. LEWIS
CURATOR, PRIMITIVE ART

THE first section of a new, major exhibition hall, to be called the Hall of Primitive Art, has just been completed. Thirty-one art objects have been installed in seven cases near the north end of Hall 2, the Edward E. and Emma B. Ayer Hall. Entitled "Primitive Artists Look at Civilization," the exhibition is the featured exhibit for July, and subsequently will remain on display for an indefinite period.

All of the works shown were made by artists who were members of primitive societies. Although the definition of the term, "primitive art," implies that the artists were isolated from knowledge of civilized societies, it is a fact that most of the recent primitive societies of the world have been in contact with civilization from the 16th to the 20th centuries. Such contacts have seldom been peaceful. Most of the objects in the exhibition were derived from colonial situations in which Europeans appear as administrators or military personnel. A few pieces are from contact situations which were not colonial, as for example, the tipi curtain made by Cheyenne Indians on an Oklahoma reservation about 1900, or the two Canadian officials carved by Haida carvers of British Columbia in the late 19th century. But it is not unfair to state that most of the objects displayed originated in culture contact situations that were to some

Left: Mounted German Official. Part of carved wooden door jamb. Early 20th century, Bali, Cameroons, Africa. Whole door jamb is 7½ feet high.

Right: Satirical Dance Mask. Represents a European in a derby hat. Early 20th century, New Ireland. Height 16½ inches.

When primitive artists depict members of their own society they generally do not resort to naturalistic portraiture, either of facial features or of body attitudes. (There are some exceptions, notably on the Northwest Coast of North America.) This was not due to inability, but was a matter of intention. Since primitive art usually functioned in important life-crisis ceremonies, especially funerary or memorial, the social characteristics and status of the represented person, rather than his personal attributes, were emphasized. This was done by means of a display of social symbols, such as clothing, face and body painting, tattoo marks, badges, clubs, spears, and the like. A face might be represented as wearing a mask. The position of the body was similarly symbolic, perhaps an attitude used in a ceremony, or the position in which the body was arranged for burial or cremation. Thus, in primitive art, characterization of an individual tended to be accomplished by means of depiction of that person in conjunction with his material status symbols and in a familiar and stereotyped, socially significant attitude—the latter often rather static and formal. (*Continued on page 8*)

Above: Traveling European. Detail from a whole procession carved from a single block of wood. Early 20th century, Bara, Madagascar. Length 41⅜ inches.

Left: German Colonial Official. Pottery, painted black. Early 20th century, Bali, Cameroons, Africa. 7⅛ inches.

Below: A Judge and a Sea Captain. Carved in the late 19th century by Haida carvers in British Columbia. Height 10¾ and 10⅝ inches.

degree unpleasant for the primitive peoples involved. It is thus most interesting to see that, although caricature was often intended, and European persons were sometimes shown in unpleasant ways, by and large the characterizations are not particularly derogatory nor malicious. Indeed, when these depictions of Europeans are compared with representations of members of the artist's own society, it is apparent that most of the characterizations were done in indigenous style. The element of satire is found more in the minds of European viewers of such works than in the intentions of the primitive artist.

However, there are some differences in the way that Europeans were depicted as compared with the treatment of indigenous subjects. There seems to have been an attempt at portraiture of Europeans, and the body attitudes, also, seem to be naturalistically observed and rendered. That is to say, in contrast with the representation of the human image in primitive art, the depiction of Europeans has tended to be more naturalistic.

PHOTOGRAPHS FOR THIS ARTICLE, INCLUDING THIS MONTH'S COVER, BY JOHN BAYALIS AND HOMER HOLDREN

CHICAGO NATURAL HISTORY MUSEUM *News*

Walther Buchen 1886–1961

The Museum records with deep regret the death on June 12, 1961, of Walther Buchen, Sr., Vice President of the Board of Trustees. Mr. Buchen was elected a Trustee and Corporate Member in December of 1952 and had served continuously on the Finance Committee since 1954. In 1957, he was elected Second Vice President of the Museum, a position which he held at the time of his death.

Walther Buchen

Mr. Buchen was born in December of 1886 and received a Master of Arts degree from the University of Illinois in 1913. He served on the faculty of the University from 1911 to 1915, when he entered the advertising profession, becoming President of The Buchen Company in 1923, and continuing in that capacity until his recent retirement.

In 1952, Mr. and Mrs. Buchen conducted an expedition to the Victoria Nile area and collected for the Museum all the specimens necessary to complete the "Upper Nile Marshbirds" exhibit which is on display in Hall 20. Mr. Buchen was always deeply interested in the work of the Museum and was a frequent visitor, having a wide acquaintance among the Museum staff. He will be greatly missed.

Honorary Degree

In recognition of his eminence in his chosen field of science, Dr. Austin L. Rand, Chief Curator of Zoology, was awarded an honorary Doctor of Science degree by his Alma Mater, Acadia University, Nova Scotia, Canada, at its recent convocation.

Publications

A new book by Dr. Rand, *A Midwestern Almanac*, has just been released for sale by its publisher, The Ronald Press Company, and is now available in the Museum's Book Shop. In the "almanac," Dr. Rand and his wife, coauthor Rheua M. Rand, describe a naturalist's delightful busman's holiday following nature's calendar through the successive seasons in the Midwest. In their journey they mingle nature lore and scientific fact about the birds, mammals, insects, frogs, and plants that mark each season. The book has 208 pages, with illustrations, and may be purchased for $4.50.

Indian Life in the Upper Great Lakes, a recently published book by Mr. George Quimby, Curator of North American Archaeology and Ethnology, was given special recognition at the Chicago Book Clinic's 12th Annual Exhibition of Chicago and Midwestern Bookmaking held in May. Quimby's book was one of 59 books from 30 publishers selected as a Top Honor Book for outstanding design, illustration, and bookmaking. *Indian Life in the Upper Great Lakes* was designed by Greer Allen and published by the University of Chicago Press.

Study Trips

Just returned from a six-week's marine study trip to Hawaii, Mr. Loren P. Woods, Curator of Fishes, is now engaged in identifying and cataloging the nearly 200 varieties of fish collected on the trip. The Hawaiian expedition was sponsored by the Shedd Aquarium and led by Mr. William P. Braker, the Aquarium's Assistant Director. Assistance was given the expedition by the U. S. Fish and Wildlife Service, by the State of Hawaii's Fish and Game Service, and by staff members of the University of Hawaii. Among the 200 varieties of fish collected on the trip are many species never before included in the Museum's research collections, and at least one new species of angel fish.

Dr. Alan Solem, Curator of Lower Invertebrates, traveled to Seattle, Washington, during April to supervise the shipment to Chicago of the Eyerdam collection of shells recently purchased by the Museum. From Seattle, Dr. Solem proceeded to Arizona where he resumed a research project begun last spring—the collecting of land snails in areas charted fifty years ago by two well-known malacologists, Henry A. Pilsbry and James Ferriss (see report in the BULLETIN for June, 1960). From the data recorded on these sites, Solem ex-

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THE BULLETIN

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Members are requested to inform the Museum promptly of changes of address.

pects to be able to learn more about the pattern of evolution in land snails during the last half-century.

Dr. Robert F. Inger, Curator of Amphibians and Reptiles, has recently returned from a study trip to Florida where he examined the habitats of numerous amphibians, tested various field techniques essential to the conducting of certain scientific experiments, and also did some general collecting. On leaving Florida, Inger traveled to Austin, Texas, for the annual meetings of the American Society of Ichthyologists and Herpetologists.

Visitors

Student groups from the University of Illinois and Valparaiso University visited the Museum's Department of Botany recently to become acquainted with its herbarium, library, and exhibition techniques. Of special interest to the Valparaiso group—students of paleobotany—was the Museum's giant fossil plant, Cycadoidea, reconstructed in the botany plant reproduction laboratory (see June BULLETIN) and now awaiting installation. The Cycadoidea reproduction is based on studies of silicified fossil specimens that reveal the minute anatomical details of the extinct plant.

Membership Gains

The Museum gained 1,638 new members during 1960, to bring its total membership to 7,350, the largest in the institution's history.

This upswing, which is part of a trend that has been developing over the past few years, appears to indicate a heightened public interest in research and scientific progress. Membership dues and contributions assist greatly in supporting the research and educational work carried on by the Museum's staff, and offer

(*Continued on page 8*)

Mark Catesby—The Colonial Audubon

George Frederick Frick and Raymond Phineas Stearns. University of Illinois Press, Urbana, 1961. 137 pages. $5.00.

Mark Catesby has been called the first great naturalist in America, and the founder of American ornithology (not the father, a title reserved for Alexander Wilson). He was primarily a botanical collector when in America, but is best known for his sumptuous, two-volume *The Natural History of Carolina, Florida, and the Bahama Islands*, published in London, 1731–43. This was a general, illustrated work, but in it was the first series of identifiable plates of American birds, each arranged with a spray of vegetation, etc. A tradition was thus established that was followed by Wilson and Audubon.

Despite the historical importance of his published work, Catesby the man has remained a shadow. He was an Englishman who made two trips to America, to Virginia and Carolina, in 1712–19 and 1722–26. Back in England he devoted 20 years to writing the text and engraving the illustrations (to lessen expense) of his great work. The dates of his birth and death were discovered only recently. Though a writer, none of his papers or journals has come down to us; though an artist and an engraver, there is no likeness known.

Only by searching out references to and comments on Catesby in the correspondence of his contemporaries, entries in their journals, the records of scientific societies, and civil records have the two authors, both professors of history, reconstructed a dim outline of the man, and this we have here in a copiously footnoted document.

Mark Catesby—The Colonial Audubon is obtainable through The Book Shop.

A. L. RAND
Chief Curator, Zoology

1001 Questions Answered About the Seashore

N. J. Berrill and Jacquelyn Berrill. Grosset & Dunlap, New York. 305 pages, illustrated. $1.75 (paper covers).

The abundance of identification manuals available today tends to obscure the fact that finding a name for a given plant or animal, mineral or rock, is only the first step taken by the naturalist. It provides the key which unlocks the door to a fuller knowledge of the object.

Through this compact (5⅜″x8″) volume, the Berrills open this door by providing the amateur naturalist with answers to 1001 questions about the seashore and the plants and animals found there. The book's 27 "chapters" cover collecting, tides, sea water, plankton, phosphorescence, seaweeds, jetsam, the major invertebrate animals, fishes, turtles, marine mammals, and shore birds. A 21-page index enables the reader quickly to locate information on any topic or organism, under either its common or scientific name.

Designed as a supplement to identification manuals, to be carried into the field with them, the book makes no claim to cover all phases of seashore life. However, it probably includes the most commonly asked questions, as well as a number that will occur only to the more serious student. Sample questions are: What makes the sea blue? Where does the water go when the tide is out? Why are some seaweeds red? How does sand get into the case of a horseshoe crab? How are the two shells of a bivalve made? How do shrimps breed? How can limy-tube worms best be seen? How deep can a gannet dive?

Visitors to the Museum may wish to expand their knowledge of the seashore and its life by carrying "Berrill" with them through the exhibition halls.

ERNEST J. ROSCOE
Division of Lower Invertebrates

MARKET DAY in Antigua

Louis O. Williams
Associate Curator, Central American Botany

In 1773 La Muy Noble y Muy Leal Ciudad de Santiago de los Caballeros de Goathemala, today La Antigua, Guatemala, was a busy and important symbol of Spanish might and dominion in the New World and an imposing capital city already more than two centuries old. In that year the Volcan de Agua, which is both a sentinal and a spectre above Antigua, awoke from its troubled rest and with earth-jarring force destroyed the city that lay along its western base. Humble house, rich man's mansion, as well as imposing cathedrals, were tumbled down into a mass of rubble and ruin.

It was not long afterward that the capital was moved from Santiago de los Caballeros into an adjacent valley where, it was hoped, further restive manifestations of the volcanos might not be so severely felt. La Antigua, or "the old one," as now it was called, was partially cleared from the rubble, only to be subsequently shaken and again rebuilt.

Today Antigua lies serenely at the base of its volcano, giving indications of its former splendor and of its troubled past only in the broken remains of its once patriarchal churches and in the houses that, here and there, still turn their roofless faces toward the heavens.

Within the shattered walls of what was once an imposing Jesuit monastery, church, and college, Antigua holds its main market. Where Spanish fathers once lived, meditated, and taught, there are bought and sold today the plebian necessities of the temporal life—beans and maize, chiles and meat, pineapples

and avocados.

Thousands of years before the coming of the Spaniards, the ancient Indians of Central America had learned to cultivate maize and beans, and to vary their diet with tomatoes and avocados. Could it have been here, millenia ago, in the fertile, volcanic soils surrounding La Antigua, that the progenitors of today's Guatemalans made the initial adventures in the cultivation of plants which laid the agricultural basis for what was to become one of America's most advanced native civilizations?

Right: Where once Jesuit fathers lived and meditated, today maize is weighed and sold.

Those Indians of ancient times must have developed a system of markets to supply food from the countryside to their centers of population. This system was maintained, and doubtless extended, through the 300 years of Spanish occupation, on into the period of independence and down to the present time.

Today, the market is many things to many people—not the least of which, and never to be overlooked or underestimated, is its importance as a meeting place for the country people. Here the news of a vast region may be passed from person to person. The Indians who twice a week bring in their produce from the valleys, mountains, and plains—or even from the slopes of the Volcan de Agua itself—linger long in the congenial atmosphere of the market to talk with friends and to exchange gossip. Amidst the ruins of the old Jesuit monastery, one hears the languages of proud races that Spanish domination for more than four hundred years has not succeeded in eradicating.

Moreover, it is not only food that may be purchased, sold, or bartered, for the market is the distribution center for many other necessities of the simple life. Hand-woven textiles of both wool and cotton are to be found in great variety. Blankets, shoes, hats, a new hoe, pottery designed for many uses—these and many more are here.

Food remains, however, the most important commodity. Maize and beans are still the basis of the Guatemalan diet, and these two staples are found in every market. Without them, the ancient American civilizations could never have developed, for they supplied then, as they do for the Indians today, the carbohydrates and proteins vital to a balanced diet.

The selection of foods in Antigua's market is greater now, however, than it was in pre-conquest times. Vegetables and fruits of old world origin are sold side by side with those native to the new world. Among the latter are tomatoes, potatoes, peppers, and avocados. To these, there have now been added cabbages, bananas, peas, oranges, carrots, apples, beets, pears, and many more that flourish in Guatemala's fertile soils and varied climates. It is this great variety of produce that makes the markets of Guatemala a revelation to one accustomed to markets in more temperate climes.

Opposite page: Among the ruins of its former grandeur, Antigua holds its pig market.

Left: Colorful costumes indicate the wearer's native village.

Photographs by the author.

Drinking Man. Probably a European sailor. Late 19th century, from the former Belgian Congo. Height 26 inches.

Cover picture: A French Colonial Official's Wife. This wooden figure was carved and painted by a member of the Bara tribe of Madagascar in the early 1920's. Height 29¾ inches.

PRIMITIVE ARTISTS look at CIVILIZATION

(*Continued from page 3*)

In representing Europeans, some of these elements are used, as is shown in the emphasis on rendering articles of clothing—for instance, the derby hat, the military tunics, and the shoes. But new problems arose. European individuals did not fit the tribal stereotypes of status symbols and attitude. The primitive artist was forced to examine critically a new kind of creature, one who not only dressed differently, but who acted differently in many significant ways. Many of the objects in the exhibition show the results of this new experience. The carved wooden door jamb, showing a German on horseback, although done in typical Cameroons grasslands style, indicates that the artist looked carefully at the man's face and head, at his hat and jacket, at his peculiar position on the horse, at the horse itself, and then rendered all of this strange subject matter in a forceful and direct way. The resultant sculptured image cannot be confused with those of Africans—the man is an European. His attitude is also strikingly projected: he is arrogant; he sits on his horse and glares disdainfully down upon the people he governs. Thus a socially important gesture, although new and unfamiliar, was keenly observed and rendered. The Cochiti Indian artist's ceramic representation of the hoarsely bellowing Spanish-American landowner from 19th century New Mexico shows that a similar observation was made, sharpened by the social relationship between master and peon.

In spite of the sharp-edged insight and occasionally hostile characterizations displayed in the group of objects exhibited, one is struck by the generally gentle and sensitive treatment afforded the European subjects by the primitive artists. It is as though a desire to produce a sensitive work of art triumphed over the temptation to malicious satire.

George Quimby, Curator of North American Archaeology and Ethnology, has long entertained the idea for the current exhibition, and it was done with his collaboration.

Spanish-American Landowner. A Cochiti Indian artist of New Mexico, in about 1870, depicts the man for whom he and other Indians worked as laborers. Painted pottery, height 12¼ inches.

MUSEUM NEWS

(*Continued from page 5*)

the general public an opportunity to share in the progress of scientific discovery. The fees of Life and Associate Members ($100 for Associate and $500 for Life) build up the endowment funds of the Museum, and are an important means of assuring the continued growth of one of Chicago's oldest educational and scientific institutions.

Television Participation

Dr. Roland Force, Curator of Oceanic Archaeology and Ethnology was interviewed on "The Virginia Gale Show," a WGN–TV color production telecast from WGN's new north-side studios, and on Phil Lind's WAIT radio interview program. On both programs he discussed his new hall.

Another anthropologist who has been making numerous appearances on radio and television is Dr. Kenneth Starr, Curator of Asiatic Archaeology and Ethnology. Most recently he appeared with Dr. Force on Tony Weitzel's WBBM radio show broadcast from the President's Walk in McCormick Place Exposition Center. The discussion centered on the anthropologist's point of view toward events taking place in Asia and the South Pacific. In a previous appearance on the program Dr. Starr discussed science and education.

Also a guest on the Phil Lind show was Dr. Eugene S. Richardson, Jr., Curator of Fossil Invertebrates. Dr. Richardson informally discussed a variety of subjects with program host Lind.

Other Staff Activities

"Orchids in the Orchid Countries of Mexico and Central America" was a talk recently delivered by Dr. Louis O. Williams, Associate Curator of Central American Botany, to the Illinois Orchid Society at their monthly meeting in the Museum.

Mr. Allen Liss, Custodian of Anthropology Collections, served as a judge in the State finals of a student science projects competition sponsored by the Illinois Junior Academy of Science. The finals were held in Urbana.

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CHICAGO NATURAL HISTORY MUSEUM

Bulletin

Vol. 32 August

No. 8
1961

CHICAGO NATURAL HISTORY MUSEUM *News*

This Month's Cover: "The Web of Life in a Michigan Lake"

Fishermen may get a preview of the sport and "good eating" that await them on their vacation trips—or take a closer look at the "one that got away"—by viewing the Museum's featured exhibit for August, a reproduction of underwater life in a typical inland lake.

Largemouth bass, bluegills, northern pike, bullheads—names to stir any angler's sporting instincts—are among the fishes shown in this habitat group, which is located at the entrance to Hall O, Fishes of the World (ground floor, west). The exhibit realistically recreates a dim, underwater scene that is authentic in every respect.

As the label makes clear, even in a lake "all flesh is grass," for the plants that form the basic food supply are nourished, in their turn, by decayed animal products. Thus plants and animals are linked in an endless cycle of life, death, and renewed life again. A diagram that forms part of the exhibit shows this web of life in the lake, in which plant eating animals are preyed upon by flesh eaters, and even the most aggressive carnivores, when they die, become food for scavengers.

The cover photograph of the featured exhibit for August is by the Museum's Division of Photography.

Round the World Study Trip

Dr. Alan Solem, Curator of Lower Invertebrates, embarks this month on a thirteen-months' study trip around the world, to begin a research project on the "Systematics and Zoogeography of Pacific Ocean Endodontid Land Snails." This project is being conducted with the assistance of a grant from the National Science Foundation.

Endodontids are the most widely distributed and abundant family of Pacific land snails. They are unique among such snails in that fossil forms from the Miocene to the Pleistocene periods (from twenty million to one million years ago) have been discovered in deep core borings on Pacific atolls. Since these snails have not yet been studied comprehensively, the extent to which historical factors, evolutionary rates, adaptive radiations, and ecological (environmental) differences have influenced their distribution is unknown. During the course of his research, Dr. Solem expects to study the shell structure, soft anatomy, and distribution of the endodontid snails. This information will provide the foundation for pursuing the adaptational and ecological studies that are necessary to determine the course of their evolution.

The National Science Foundation grant of $18,000 awarded the Museum for this research will be applied over a period of four years. During the first thirteen months Dr. Solem will travel to Hawaii, the Society Islands, Fiji, New Caledonia, New Zealand, Australia, Malaya, Kenya, Egypt, and all through western Europe, gathering specimens and studying collections of endodontid snails. The fossil species found in deep core drillings on Bikini, Eniwetok, and Funafuti atolls will be compared with living forms in order to determine their relationships and gain information about past distribution patterns.

Radio and Television

On Sunday evening, August 6, at 8:30 P.M. the Museum will be featured on "Chicago Portrait," a half-hour program presented each week by Norman Ross over radio station WLS. In an interview with program host Ross, Mr. John R. Millar, Chief Curator of Botany, and Dr. Kenneth Starr, Curator of Asiatic Archaeology and Ethnology, will outline the Museum's history, its exhibition program, and its activities in education and scientific research.

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THE BULLETIN

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Members are requested to inform the Museum promptly of changes of address.

Visitors

During the month of July, Father Thomas Borgmeier, O.F.M., of Rio de Janeiro, Brazil, spent a week in the Museum's Division of Insects, where he studied guests of ants and termites and Phorid flies and conferred with the staff. Father Borgmeier is one of the distinguished entomologists of South America and has served as editor and founder of two entomological journals.

(*Continued on page 5*)

Illustration from Wau-Bun, the "Early Day" in the North-West, *by Mrs. John H. Kinzie. Published in 1856.*

Early Records of Chicagoland Birds

Ellen T. Smith
Associate, Division of Birds

Drawings by Marion Pahl

THREE hundred years ago, when Chicago was a swamp and the Indians enjoyed the freedom to live as they chose, there was no one in the Great Lakes area to record the wonders of nature or the profusion of wild life. No bird watchers made lists; no scientists studied the birds' habits. But birds were there all the same—most of them living, nesting, and migrating as we see them today and enjoy them from various individual points of view.

The Indians made use of the birds of the region as their ancestors had done. They shot what they needed, and there remained plenty of turkeys, pigeons, grouse, and prairie chickens to breed and supply needed food throughout the year. Feathers were used on the shafts of arrows, on head-dresses, for personal adornment, and for other ornamentation. For example, Indian calumets, or ceremonial pipes, were usually decorated by stuffing one end into the neck and head of a bird, most often a loon or a wood duck, and then adding feathers of various colors to the shaft, red denoting a war calumet, green or other colors for peace calumets or those conveying safe conduct. These calumets were smoked on special occasions, or were carried in full view as respected symbols. The head and neck of a loon exhibited in Hall 5 of the Museum could well have been used on a calumet.

THE first mention of specific birds in the Chicago region is in the journals of Father Jacques Marquette's second voyage. On December 4, 1674, on reaching the Chicago River, he found "more snow there than elsewhere, as well as more tracks of animals and Turkeys." On December 12, his party killed three or four turkeys out of many that came around their cabin, and Jacques, one of Father Marquette's young companions, brought in a partridge ". . . exactly like those of France, except that it had 2 ruffs of 3 or 4 feathers as long as a feather near the head, covering the 2 sides of the neck where there are no feathers." Undoubtedly a prairie chicken! On March 23, 1675: "We killed several partridges, only the males of which had ruffs on the neck . . . . These partridges are very good . . ."

On March 30 of the following year, the good Father noted: "The north wind delayed the thaw until the 25th of March, when it set in with the south wind. On the very next day, game began to make its appearance. We killed 30 pigeons, which I found better than those down the great river, but they are smaller, both old and young." The "30 pigeons" presumably were mourning doves; those down the "great river" were probably passenger pigeons.

The next day, traveling up the Chicago, they saw Canada geese and ducks passing continually, and on the Des Plaines River, many migrating "cranes."

In 1712, one of the Jesuit missionaries, Father Gabriel Marest, remarks in his journal under date of November 9 that "game is very abundant. Above all we found quantities of swans, cranes, bustards and ducks. The wild grain which grows naturally in the country fattens them so that they die of being overstuffed! Turkeys are just as numerous, and they are as good as those in France."

Loons were also abundant, and John Long, in his *Voyages and Travels of an Indian Interpreter and Trader 1768–88*, reports that the Indians used the dried skins of these birds to make cases to cover their guns, so keeping them from getting wet. Loon hunting is described by Jonathan Carver in his *Travels through the Interior Parts of North America in 1766, 1767, and 1768:* "These birds are exceedingly nimble and expert at diving, so that it is almost impossible for one person to shoot them, as they will dextrously avoid the shot by diving. . . . It requires three persons to kill one of them, and this can only be done the moment it raises his head out of the water as it returns to the surface after diving." Although Carver reports that the flesh was very "ill-flavored," it "repays the trouble taken to obtain it, by the excellent sport it affords." This is the first mention of killing by white men for "sport."

Carver also listed the "Birds which are found in the interior Parts of North America" and gives ten pages of descriptions, the following being of particular interest:

"The WHIPPERWILL, or, as it is termed by the Indians, the Muckawiss. This extraordinary bird is somewhat like the nighthawk in its shape and colour, only it has some whitish stripes across the wings [Carver has here confused the wing markings of the two birds] and like that is seldom ever seen till after sunset . . . during the spring and summer months. As soon as the Indians are informed by its notes of its return, they conclude that the frost is entirely gone [and] begin to sow their corn. . . . The Indians, and some of the inhabitants of the back settlements, think if this bird perches upon any house, that it betokens some mishap to the inhabitants of it."

Of the blackbird, Carver says: "There are three sorts of birds in North America that bear this name; the first is the common or . . . crow blackbird [bronzed grackle]. . . . In the month of September this sort fly in large flights, and do great mischief to the Indian corn, which is at that time just ripe." This is the first account depicting a bird of the Chicago region as an enemy to man.

Louis Armand de Lom d'Arce, known to history as the Baron Lahontan, came to New France in 1683. He seems to have been an amateur naturalist. Like Carver, he made lists of trees, fruits, animals, birds, and insects (under which he included rattlesnakes and frogs!) found in the "North and South Countries of Canada." Among the 63 birds listed is one he calls "a nightingale unknown to Europe. . . . That sort of Nightingale that I saw, is of a peculiar form; for 'tis of a lesser size than the European, and of a bluish color, and its notes are more diversified; besides that, it lodges in the holes of Trees, and four or five of 'em do commonly keep together upon the thickest Trees, and with joynt Notes Warble o'er their Songs." This was our bluebird. He also speaks fondly of a "Oiseau Mouche [hummingbird], a very little bird resembling a Fly; . . . no bigger than one's Thumb, and the colour of its Feathers is so changeable, that 'tis hard to fasten any one colour upon it. . . . Its beak is as sharp as a Needle. It flies from Flower to Flower, like a Bee, and by its fluttering sucks the flowery Sap." Another bird was the wood duck "call'd Branchus. . . . They owe the name of Branchus to their resting upon the branches of Trees."

Father Louis Hennepin, a Recollect priest who traveled with LaSalle from 1679 to 1682, left a graphic description of their canoe trip from La Baye des Puans (Green Bay) to the River of the Miamis (St. Joseph's River) at St. Joseph, Michigan. The stormy October weather made life difficult and their only food was a handful of Indian corn a day. They often had to wade in the cold, shallow water, pushing their three great canoes to prevent them from swamping—a very difficult task for starving men. Suddenly they saw crows and eagles circling around what they hoped might be some game. They hurried to the spot, and, sure enough, there was a buck that had been killed by a wolf and only partly eaten. They finished the animal, praising God for sending his birds to save them from starvation.

IN 1779, Jean Baptiste Point de Sable, a native of Santo Domingo, who was a "well educated and handsome" free mulatto, loyal to the French, left his home at Peoria and came to live among the Pottawatomie Indians at "Eschika-

gou." He built a cabin on the north bank of the Chicago River, and became a "pretty wealthy trader," well known as far north as Michilimackinac. In 1800 he sold his stock in trade, his cabin with its furnishings, and other out-buildings, to an Indian interpreter, Jean Lalime, who resold them in 1804 to John Kinzie. According to the bill of sale now in the possession of the Chicago Historical Society, one of these "out-buildings" was "one chicken house of 15 squares," and among the livestock itemized were 44 big hens, so we know that chickens had been introduced to the Chicago region at some time prior to 1796, possibly by the Jesuit missionaries.

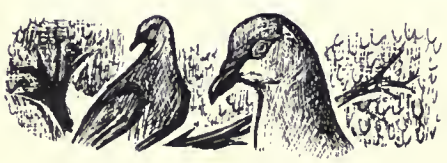
In 1823, William Keating, who accompanied Major Long's expedition to the source of the St. Peter's River, passed Fort Dearborn, the fort at the mouth of the Chicago River, in June. He was greatly disappointed at finding that Chicago "consists of but few huts . . . log or bark houses . . . low, filthy and disgusting, displaying not the least trace of comfort. . . ."

"The difficulties which the agriculturalist meets with here," he reports, "are numerous. . . . There are . . . a number of destructive birds of which it was impossible for the garrison to avoid the baneful influence, except by keeping as was practiced at Fort Dearborn, a party of soldiers constantly engaged in shooting at the crows and blackbirds that committed depredations upon the corn planted by them."

Keating also notes that, although "the quality of game in this part of the country is diminishing very rapidly and . . . is barely sufficient for the support of the Indians, still there is enough, and particularly of the smaller kind, to offer occupation to the amateur sportsman. There are many different kinds of aquatic birds which feed upon the wild rice (Zizania aquatica) and other plants that thrive in the swamps which cover the country." The effects of "civilization" were beginning to be felt and the point of view of the sportsman appears often from now on.

Ten years later, in 1833, Colbee C. Benton, of Lebanon, New Hampshire, made a nine-day trip through the Indian settlements north and west of Chicago. It was August, and Benton found a great many ducks, large flocks of wild geese, plenty of pigeons, and prairie chickens. He also saw many loons but "could not get a shot at them." Mosquitoes plagued him constantly, hooting owls kept him awake several nights, and he was wakened early in the mornings "by the squawking of ducks and other fowl." At Grass Lake he records: "It is the greatest place for game here that I ever saw. The ducks and wild geese and loons, sand cranes and other fowls, are continually passing this place. It seems to be their only thoroughfare."

On Saturday night, August 24, he and Louis Wilmot camped on Turtle Creek near Delavan Lake, where they killed and roasted a prairie chicken for their dog. At a distance, they "could distinctly hear the lonely howling of the wolves. Sometimes they would seem to be very near, and the owls accompanied them with their hoarse hooting . . . so it continued until daylight. By the way, the mosquitoes joined the music of this interesting night with their eternal singing. . . ." Several "ugly rattlesnakes" startled them, and they killed one or two. On the whole, Benton's interesting account does not make one envy his experience![1]



Chicago was growing. According to Patrick Shirreff, in September, 1833, it consisted of 150 wooden houses along the river. Its inhabitants had to be fed. Peck's *Gazetteer* in 1834 informs us that hundreds "of partridge were taken in a day in nets in the winter, and furnished no trifling item in the luxury of the city market."

Another source of food was had from the great flights of the now extinct passenger pigeon, often called "wood pigeon," which was plentiful in Illinois up through the first half of the 19th Century. "When one approaches the country of the Illinois, one sees during the day, clouds of doves, a kind of wood or wild pigeon. A thing that may perhaps appear incredible is that the sun is obscured by them; these birds live only on the beechnuts and acorns in the forests, and are excellent in autumn, sometimes as many as 80 of them are killed with one shot."[2]

According to Donald Culross Peattie, there were such large flocks of pigeons in Chicago in 1836 that men went about the streets singing popular songs about them.

This was also the year in which Dr. John Kennicott and his wife, Mary, with their year-old son Robert, moved from New Orleans to settle near Chicago in a grove near Northfield.

It was young Robert Kennicott who was destined to usher in the era of scientific study of the birds of the Chicago region, a study which profited much from the gentle but indomitable Pere Marquette, from Baron Lahontan of the inquiring mind, from Hennepin, and Carver, and all the others who have given Chicago its birthright.

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[1] The authorship of Benton's *Journal to the "Far-off West"* remained unknown until established by James Getz of Metawa. See Colbee C. Benton, *A Visitor to Chicago in Indian Days* edited by Paul M. Angle and James R. Getz. Caxton Club, Chicago: 1957.

[2] N. Bossu, *Nouveaux Voyages aux Indes Occidentales.* Paris: 1698.

MUSEUM NEWS

(*Continued from page 2*)

More than a hundred high school science and mathematics teachers visited the Museum recently under auspices of the Fifth National Science Foundation Summer Institute of Kansas State Teachers College. In addition to touring the exhibits, the teachers were briefed on the Museum's program of scientific research by Mr. E. Leland Webber, Assistant Director, and by members of the scientific staff.

Scientific Meeting

Mr. George I. Quimby, Curator of North American Archaeology and Ethnology, presented a paper on "Late Woodland Culture in the Upper Great Lakes Region" at the annual meeting of the Society for American Archaeology at Columbus, Ohio.

Editor's Note: Loren P. Woods, Curator of Fishes, recently spent six weeks in Hawaii as a member of a marine study trip sponsored by the Shedd Aquarium and led by Mr. William P. Braker, the Aquarium's Assistant Director. Nearly two hundred varieties of fishes were collected on the trip, many of which had never before been included in the Museum's research collections. In this series of brief sketches Mr. Woods describes the different fishing techniques used by the expedition in obtaining these important specimens.

Fish Collecting in Hawaii

There are about 450 species of fishes around the Hawaiian Islands living in depths to one hundred feet. Some of these fishes are abundant and conspicuous; others hide and are seldom, if ever, seen or taken by conventional fishing methods. The ancient Hawaiians knew the exact habitat and something of the habits of the many kinds of fishes living in their reefs, and had devised a number of ingenious methods for capturing them. Decoys were used to lure fishes that were especially pugnacious or curious. A variety of bag nets, dip nets, weirs, and traps were manipulated or set to intercept fishes known to move over a particular place. The use of torch lights, throw nets, nooses, spears, and poison—made by pounding a poisonous weed mixed with sand, so it would sink—procured fishes that were not easily taken by other methods. Hand fishing produced octopuses, shellfish, and spiny lobsters, while hook-and-line fishing was used for the larger offshore fishes. Another method was to block off shallow bays by building walls of coral or lava boulders. The resulting ponds could be opened to the sea at high tide, when the fish moved inshore, and then closed, trapping the fish so they could be fattened or held until needed.

Taking these methods as our precedent, we employed whatever techniques would produce the variety of fishes desired by both the Aquarium and the Museum for their collections.

The Rocky Fill at Kewalo

The promontory enclosing Kewalo Basin, on which the U. S. Fish and Wildlife Laboratory is located, is protected by a riprap of irregular, large, cindery, lava blocks. These blocks make a shelf, just exposed at low tide and densely covered with a vine-like brown seaweed. A bizarre scorpion fish lives here, the same color as the weeds and so secure in its camouflage that it could be captured by pinching its high fin, as one would pick a butterfly off a flower. Spiny puffers were caught in a dip net by locating the hole in which they were hiding, placing the net in a strategic position and giving the fish a gentle (because of the spines) nudge with the other hand.

By far the most successful method of catching the colorful butterfly fishes, damsel fishes, tangs, and eels, as well as the blue and white polka dot boxfish, variegated wrasses and bright red and white striped squirrel fishes, is in a large wire trap. These traps are built like a quonset hut, with an opening at one end for fish to enter, and they are baited with broken china, since a dead fish bait at-

tracts too many moray eels. Many part time fishermen work similar traps in offshore waters eighty to a hundred feet deep. The traps are visited once or twice a week and to prevent their being robbed or stolen the buoys are underwater attached to an anchor rope and located by landmarks on shore. The most successful fishermen are those who are best at finding their hidden traps.

Halona Tide Pools

The shelving projections of the rugged Halona coast area hold a great many elongated shallow splash pools above high tide level. Here live the large active rock skippers. Rock skippers are blennies with high dorsal fins, long caudal fin, and roving habits. Though more active at night, they have no hesitation about leaving the water and skipping across the brown lava rocks, even during the middle of the day when these rocks are dry and heated by the sun. Often when we approached the pools several rock skippers would emerge and flip away over the edge of the cliffs into the foaming surf ten to fifteen feet below.

We soon learned to approach carefully and to cut off their escape route to the sea by means of a one-man net with a long funnel that looks to a trapped fish like a hole through which it may escape. If, instead of making a dash for the sea, the rock skippers chose to hide in a hole in the rock or to wedge themselves under a ledge, one of us probed with coat-hanger wire to tickle them from their hiding places. Besides being fast, the fish were very clever at avoiding the nets, instantaneously seeing a crevice through which to escape or else jumping around the net. Even in the collecting bucket, they would scale the straight metal sides part way and jump out when the net cover was lifted.

Trigger Fishes

The reef in Maunalua Bay is flat and fairly deep. In depths of twenty to thirty feet, scattered trigger fishes swim slowly around. A diver swimming after them can chase them into a hole where they lock themselves in by erecting their first dorsal spine. Then the diver can reach in, unlock the spine by depressing the second "trigger" spine and pull the fish out. Cautious divers look into the hole first before reaching in, for there might be a moray or sea urchin there.

Coconut Island

Coconut Island, on which the University of Hawaii Marine Laboratory is located, lies in Kaneohe Bay on the reef about a mile offshore. Reef fishes taken in traps for various purposes by the Laboratory collector are freed in artificial ponds. Though the ponds are relatively shallow with a mud bottom, sailfin tangs, moorish idols, sergeant-majors, and island perch flourish there. We borrowed a long seine from the Laboratory and spent the morning collecting these colorful fishes.

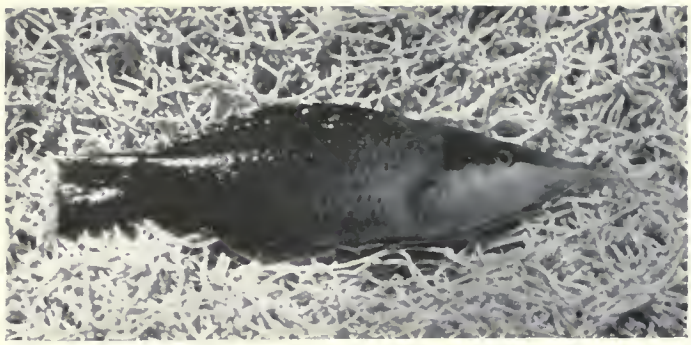
The Laboratory collector regularly operates traps and the majority of fish—butterflies, wrasses, file fish, lion fish, yellow tangs and unicorn fish—are kept in large square wire boxes suspended from a float in one of the lagoons. The fishes we collected that were not used for experimental purposes were transferred to the Aquarium tanks, being transported in the live well of one of the Laboratory skiffs. Those that died were preserved for the Museum collection.

Poisoning Tide Pools in Kahuku Point

It is much easier to collect fishes if you don't need them alive. For example, the method that produces the greatest variety of fishes (often tiny secretive species that cannot be caught any other way) is to take them by means of a chemical. The chemical first produces an effect of asphyxiation, causing the fish to leave their hiding places and swim erratically. Many can be dipped up still alive, while dead ones can be found by carefully quartering back and forth among the rocks and seaweeds covering the bottom.

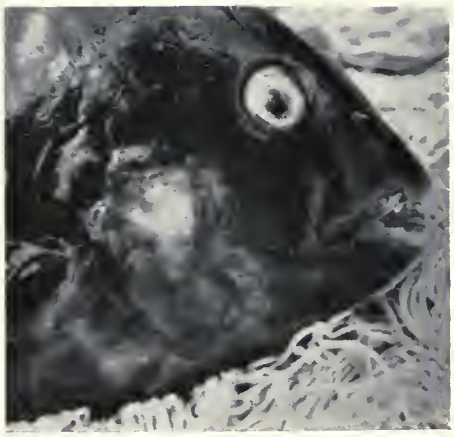
The day we chose for this work had a convenient low tide at eleven A.M. The place was Kahuku Point, the northern tip of Oahu. The most favorable circumstance was a rare lack of wind, so the surge was minimal. The resulting collecting operation was a complete success, yielding about eighty species for the Museum, including unusual morays, smaller yellow macaroni-shaped eels, as

Left: *Emptying quonset-shaped wire fish trap on the ledge at Kewalo Basin.* Right: *Using bag nets to catch rock skippers in splash pools on shelves above the high tide line off the Halona coast. Water for these pools is splashed in by the breaking surf in the background. The bag net prevents the agile rock skippers from escaping to another pool or into the sea.* Opposite page: *A biologist from the State of Hawaii Fish and Game Department prepares to leave the* Makua *to make underwater photographs in artificial reefs eighty to ninety feet below the surface. Note the boxed waterproof camera on deck at right.*



Above left: *A bird wrasse. The long beak is used for probing into branched coral in search of tiny crabs.*

Right: *Head of a parrot fish. The irregular, beak-like teeth are used to bite off bits of coral, which are then ground up by throat teeth. Such feeding habits by many kinds of animals are an important factor in wearing down reefs and producing coral sand.*



Above: *A rare deep water wrasse. This species was first described in 1958, and this is only the fourth known specimen to be collected. The head is gold with blue spots. These specialized wrasses have four chisel-shaped teeth that are not for biting but point straight forward.*

well as a variety of burrowing eels, gobies, blennies, and wrasses.

Coral Fishes

On the reef several kinds of small fishes stay close to the dendritic corals, pressing close in the forks of the branches whenever danger threatens. They feel so safe here that a diver may lift the coral head, swim some distance with it and then hand it out of the water and into a tub before shaking the fishes out. The most abundant is a black damsel fish, the size and shape of a quarter with a white spot on the sides. There are also lemon-yellow tangs, red, brown and green scorpion fishes and their peculiar relatives, the velvety caracanthid, a chubby, snub-nosed fish covered with tiny bright red spots.

On the shallow reef flats, where the water is only two to three feet deep, the small fishes that habitually seek shelter in the coral can be caught by surrounding the coral cluster with a net. To find a cluster where fishes were numerous, the Chinese fisherman helping us filled a soft drink bottle with clear oil and water. Through the perforated cork of the bottle he shook a fine oil spray on the water, clearing the surface as though a large glass had been spread. After surrounding the coral with the net, the coral was broken up and discarded. The net was then pulled up with the fishes in the bag.

The "Makua"

The Fish and Game Department of the State of Hawaii is working to improve fishing for both anglers and commercial fishermen. One part of this program is the construction, out of old car bodies, of artificial reefs on the extensive, relatively barren sand flats that occupy most of the offshore area between the living coral and the drop-off into deep water. In addition to building the reefs the program includes stocking them with snappers from the mainland and a colorful grouper from Tahiti and Samoa. The principal groups of predatory fishes around Hawaii are the pelagic tuna-like fishes, the pompano-jack family, and the large reef-dwelling morays. The introduced snappers and groupers fit into an unoccupied niche of bottom area too deep for morays and jacks.

The Department's key piece of equipment is the sixty-five foot motor vessel, the *Makua*. We joined the Department's staff on a two-day cruise, the main purpose of which was to go down eighty or ninety feet in aqualungs to try to find young of the introduced species in order to determine their success in spawning after being transported to this relatively colder environment. Small groupers were found, but no snappers. We profited by catching a variety of fishes that were saved alive in the wells of the *Makua* or placed in the freezer and on our return preserved for the Museum collection.

Beyond the Reef

In addition to using more unorthodox methods of catching fish, we spent plenty of time angling over sandy bottom for purple-banded goat fishes and over reefs for the beautiful pink and black striped wrasse called "Hilu." On one occasion we went far beyond the reef in a fourteen-foot skiff with a five horsepower outboard motor. With four men on board, plus a live well full of fish and water, there was little freeboard, and the swells were ten to fifteen feet high. All was well, however, until the wind blew stronger and the waves began to break. We shipped gallons of water. There was nothing to do but bail while we carefully worked our way back into the lee of Mokapu Peninsula. In addition to being soaking wet and worried about how far we might have to swim, it was past lunch time, but no one felt much like eating because of the bouncing. Our elderly Chinese fisherman shook his head when we reached the relative safety of the lee and remarked that he had not thought we would make it. His fifty years of experience on Kaneohe Bay plus a smooth-purring outboard brought both fish and fishermen back to port that day.

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CHICAGO NATURAL HISTORY MUSEUM

Bulletin

Vol. [illegible] No. [illegible]

September [illegible]

CHICAGO NATURAL HISTORY MUSEUM *News*

Preview of Fall Programs

October will herald the beginning of Chicago Natural History Museum's free adult lecture series offering colorful motion picture programs—narrated in person by well-known travel lecturers—each Saturday during October and November. The programs are presented in the James Simpson Theatre at 2:30 P.M. Reserved seats will be held for Museum Members until 2:25 P.M.

October 7—Hong Kong—Bamboo Curtain Colony *Phil Walker*

October 14—Cyprus, The New Republic *Robert Davis*

October 21—Devil's Highway
(an expedition down the Colorado River) *John M. Goddard*

October 28—Heart of the Wild
(waterfowl, shore birds, and bighorn in their marsh and mountain homes) *Cleveland P. Grant*

A complete, and more detailed, listing will appear in next month's BULLETIN.

Also offered at the Museum every Saturday during October and November are free motion pictures for children. The films on a variety of natural history subjects will be presented in the James Simpson Theatre at 10:30 A.M. They are provided by the James Nelson and Anna Louise Raymond Foundation.

October 7—The Miracle of Trees
(from the giants of all living things, the sequoias, to the commonest of our shade trees)

October 14—Savage Splendor
(a brilliant parade of wild life in the African jungle)

October 21—Hibernation
(how living things get ready for winter)

October 28—Niok
(the story of a baby elephant in tropical Cambodia)

Foreign Visitors

Two groups of distinguished foreign visitors toured the Museum recently as guests of the United States Department of State.

From the Soviet Union came Mr. A. Pashchenko, Director of the Kiev Institute of Art; Mr. A. Gritsai, painter; Mrs. L. Kremneva, sculptor; and Mr. K. Bogdanas, sculptor. The Russians were especially interested in seeing primitive art, and their attention was drawn to the Museum's outstanding collection by Mrs. Courtney Ellis. Escorted by Mr. Phillip H. Lewis, Curator of Primitive Art, Mr. Emmet R. Blake, Curator of Birds, and Mrs. Ellis, the visitors were shown primitive art on display in the new Hall of Polynesian and Micronesian Cultures (Hall F), in the African halls, in the American Indian halls, and in the new Hall of Primitive Art (Hall 2, the Edward E. and Emma B. Ayer Hall). Here the Russian visitors were delighted with the carving by an artist from the Aleutian Islands of a Russian explorer in a three-seated bidarka, a kayak-like craft, paddled by Aleut hunters. This carving is part of the newly installed exhibit entitled "Primitive Artists Look at Civilization."

The second group of visitors was composed of seventeen representatives from leading museums all over the world. They were in Chicago under auspices of the American Association of Museums in cooperation with a State Department program enabling administrators of foreign museums to visit and study similar scientific and cultural institutions in the United States. After touring the exhibition halls and meeting the scientific staff, the visitors were honored at a luncheon in the Museum arranged by Director Clifford C. Gregg.

Scientific Meetings

Dr. Roland W. Force, Curator of Oceanic Archaeology and Ethnology, delivered a paper on "Political Change In Palau" at the Tenth Pacific Science Congress of the Pacific Science Association which began in Honolulu on August 21 and will continue through September 6. Dr. Force was selected to head the conference symposium, "Induced Cultural Change In the Pacific: Political Organization." The conference is sponsored by the National Academy of Sciences (Washington, D.C.) and

(*Continued on page 7*)

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Members are requested to inform the Museum promptly of changes of address.

—— *THIS MONTH'S COVER* ——

Our cover calls attention to the Museum's featured exhibit for September, a graphic representation of the botanical background of Scottish tartans. Superimposed against a tartan pattern—Ancient Stewart, muted colors—is a blossom of the woad plant, one of the dye-plants used in that tartan. Woad produces a blue dye and is used also as a mordant for fixing dyes. The cover was designed by Robert Anderson, Artist, Department of Botany, with the cooperation of the Museum's Division of Photography.

A GENERATION OF Kings

The Monarch is, in a sense, the king of American butterflies. Its orange brown, black-edged color pattern and bold flying habits make it conspicuous and familiar to everyone. The eggs are laid on milkweed, and by the middle of August the caterpillars—vividly banded in black, yellow, and white—may be found in almost any milkweed patch. In late August the caterpillar transforms into a chrysalis, a beautiful jade green jewel decorated with gold spots. In ten days or so the chrysalis becomes clear and the butterfly within, now fully formed and ready to emerge, can be seen. Some time during late August or early September the butterfly leaves its chrysalis and soon joins its fellows for the fall migration flight into central Mexico, during which it rests at night in trees. Hundreds of Monarchs clustered quietly in a tree, thick as leaves, make a spectacular sight.

Photos by D. DWIGHT DAVIS

DURING the past year leading news magazines and popular periodicals have drawn attention to a project aimed at the drilling of a hole through to the earth's mantle. This is the so-called Mohole project, which is currently under way. Most of the accounts published thus far have done little to establish the purposes and aims of the venture. Nor has much been said concerning the background history that has led up to it. The reporting has been largely concerned with the difficulties involved. One leaves these reports with the impression that the project is interesting—but why bother? In this article, we hope to change that impression by adding a little depth to the bare fact that a group of individuals have taken upon themselves the enormously difficult task of drilling a hole into the earth to a level where they will intersect a vague object with the improbable name of The Mohorovicic Discontinuity.

Over the past hundred years geologists have accumulated an extensive and impressive knowledge of the history and processes operating in the genesis of the continents which make up about one-third of the earth's surface. The oceans which cover the remaining two-thirds of the surface are still largely a mystery. However, during the International Geophysical Year (1957–1958) considerable progress was made in a concerted study of the oceans and their basins. Under this impetus oceanographic research is expanding yearly. However, we still do not have any *direct* knowledge of the earth's interior. Up to now our information about the constitution of the bulk of the earth has been derived by inference chiefly from three sources: 1) If we assume that meteorites are fragments from the interior of a disintegrated planet similar to the earth, then we can draw reasonable conclusions about the interior of the earth itself. 2) The effect of the moon's pull upon the earth and its oceans (the tides) can be measured with considerable accuracy. If, then, several hypotheses are made concerning the composition and structure of the earth's interior, we can compute the effect that this pull *should* have under each hypothesis. The computation which comes closest to the observed values presumably is the best one. Nevertheless, the picture it yields of the earth's interior is still hypothetical. 3) During earthquakes and major volcanic eruptions the shock waves that move through the earth can be detected by sensitive instruments called seismographs. By interpreting the paths and velocities of these shock waves, inferences can be made concerning the composition and structure of the interior.

The third method listed above has been the most fruitful in giving indirect information on the earth's interior, and for our purposes here it is worthwhile describing a few of the major features of the science of seismology.

An earthquake is caused by the motion of one portion of rock against another along a fracture called a fault. The motion is generally not large at any one time; movements of less than one foot are most common. However, repeated movements along the same fault over several million years can result in thousands of feet of total displacement. The fault fracture itself may not necessarily extend up to the surface of the earth at all. In fact, most of them do not. They commonly die out gradually over thousands of feet just as most of the fractures in a shattered window pane die out before reaching the edge of the window. Thus, earthquake tremors are generated

at all depths, from very shallow surface movements to movements at depths of over 400 miles.

Although news reports of earthquakes are quite infrequent, quakes are, in reality, almost daily occurrences. Ninety per cent of them are of such small magnitude as to be unnoticed. Earthquake shock waves are, at least in part, like sound waves. Experience has shown us that we can often see an event before we hear it. We see a man in the distance fire a gun but do not hear the report until after a lapse of time. Similarly, when an earthquake generates shock waves a period of time elapses before they reach the surface and are recorded by the seismograph. The time it takes to cover a given distance depends directly on the density and uniformity, or lack of uniformity, of the rocks through which the waves must pass.

Experiment has shown that the velocity at which shock waves travel is higher in denser rock and lower in relatively less dense rock. A liquid, on the other hand, will almost entirely absorb these waves so that none of them gets through. Furthermore, from experience we know that sound waves can be reflected, or echoed, off walls, canyon sides, hills, etc. Similarly, shock waves in the earth will reflect partly or wholly when they encounter a radical change in density, as would happen if definite layers of different density existed within the earth.

Seismologists have been gathering data on the velocities and reflections of earthquake shock waves for over seventy years. The result of their interpretations is the familiar picture of our earth as a layered planet (Fig. 1). Our chief interest here is in the layer called the mantle, which makes up about 84 per cent of the volume of the whole earth.

In 1909, the Yugoslavian seismologist, A. Mohorovicic (pronounced Moe-hor-o-veetch'-ic) observed that shock waves from a local quake near Zagreb were partially reflected and changed velocity from about four miles per second to five miles per second at a depth of about twenty miles. He interpreted this as an abrupt change in the density of the layers through which the waves were traveling. Over the past fifty years numerous observations by many seismologists have verified this break in uniformity within the earth's interior and have named it, in honor of its discoverer, The Mohorovicic Discontinuity (Fig. 2). It marks the bottom of the earth's crust and the top of the earth's mantle. Above this discontinuity (usually shortened to "Moho") the average density is 2.8 grams per cubic centimeter. Below it, the density jumps to 3.3 grams per cubic centimeter. Further refinements over the last fifty years have indicated a slight rise in density just above the base of the crust, before the sharp rise at the Moho itself.

The question is, then, just exactly what change occurs at the Moho? The top of the crust can be observed directly and is known to consist mostly of a light-colored rock called granite, usually composed of three common minerals: feldspar, quartz, and biotite (black mica). The base of the crust, at which the slight rise in density (and wave velocity) occurs, cannot be observed directly. Hence we must make an educated guess. Since many volcanic lava chambers lie in the lower parts of the crust we may assume that the lava which comes out is largely representative of this level. The lavas are dominantly basalt, which is composed of the minerals plagioclase, pyroxene, and olivine. Thus it appears that the crust gradually changes downward from granite to basalt, which has a density of about 3.0 grams per cubic centimeter. However, below the Moho, which lies between the base of the crust and the mantle, there are several possibilities and no observable evidence of which may be correct. The known density of 3.3 fits a rock called peridotite (olivine and pyroxene), one called dunite (mostly olivine alone), and a rare rock called eclogite (pyroxene, amphibole, and garnet). In addition, it has been conjectured that under very high pressures, such as those at the top of the mantle, the mineral olivine would be squeezed to a more compact form with a higher density. Thus an olivine-bearing basalt would only require that its olivine content be converted to the higher density type to achieve the appropriate jump in the average density of the rock as a whole. Laboratory attempts to make the higher density form of olivine have not succeeded, however, because of the difficulty of maintaining a high enough pressure for a long enough time.

There is no way to choose among these various hypotheses as to the composition of the earth's mantle, although it is generally believed that the eclogite theory is the least likely. Thus it comes down to three choices: peridotite, dunite, or simply a continuation of basalt in which olivine has been converted to a high density form.

The existence of The Mohorovicic Discontinuity is well established, with all seismologists in agreement on this point. Furthermore, since its recognition in 1909 refinements in measurement have been made and it is now known that the

IN THE BOTTOM OF THE SEA

EDWARD J. OLSEN, CURATOR, MINERALOGY

Moho dips to greater depths under continents and rises to shallower depths under the oceans. This is a direct consequence of the fact that continents, which are granitic, literally float on deeper rock, depressing it beneath them (Fig. 2). Thus, beneath any continent the Moho lies at least twenty miles below sea level, while in mountainous regions, the added load depresses the Moho to depths of thirty to forty miles. Under an ocean, however, the Moho layer lies only about six miles below sea level, or some three miles below the ocean bottom. Furthermore, the distance approaches two and a half miles below the bottoms of certain deep sea trenches.

In addition to all this, it is known that even under fairly level ocean bottoms the Moho possesses slight rises and dips which cannot be due to different weights of overlying rocks since these rocks are fairly uniform in thickness. It has been conjectured that the Moho may represent the original, primordial land surface of the earth before the granitic continents were formed.

This, then, is the background to the present Moho story. Speculations, hypotheses, and educated guesses concerning the true nature of the Moho have been heaped upon each other without any means of judging which may be correct—if any is at all!

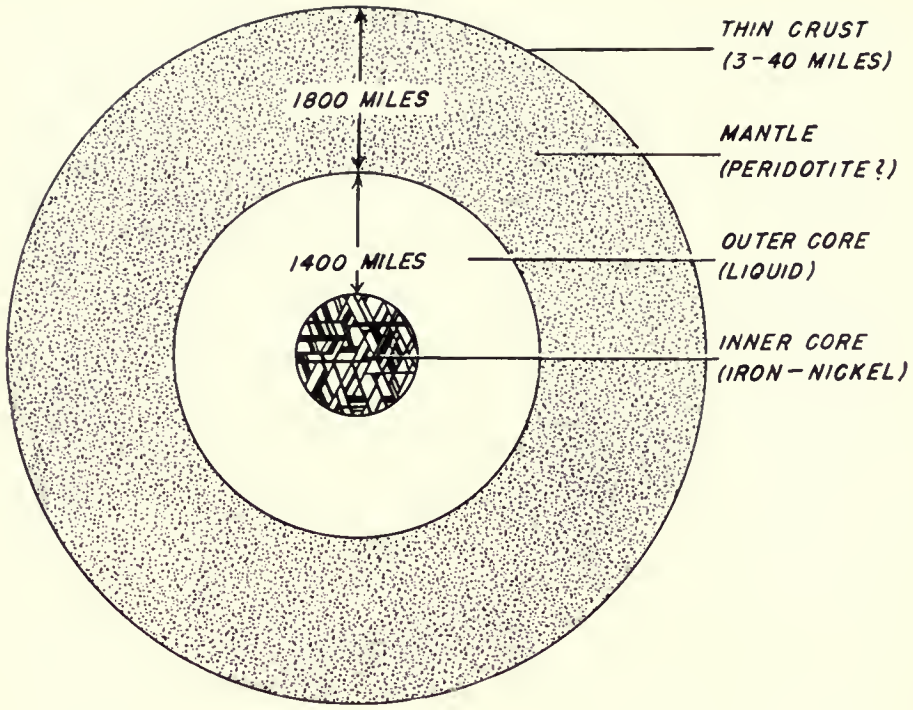

Fig. 1

In 1957, the American Miscellaneous Society (AMSOC) was formed by a group of scientists from the Earth Science Committee of the National Science Foundation to investigate the feasibility of drilling to the Moho. They reasoned that billions of dollars (and rubles) will be spent in the next twenty years to reach the moon, Mars, and other planets, while we will still be ignorant of what lies three miles below the ocean bottom, although only a few hundred pounds of samples taken from this area would give us a major clue to the nature and composition of 84 per cent of the volume of the earth on which we live. The deepest hole that had been drilled was an oil exploration hole that went to 23,000 feet. Since it was on the continent it did not, of course, hit the Moho. Current drilling technology indicated that a 25,000 to 30,000 foot hole (five to six miles) would be possible. If drilling took place on the open sea, above a deep sea trench, the drill could simply be lowered the first three miles and would have to drill through rock for only about another 16,000 feet to tap the Moho. Furthermore, no drilling through upper crustal granite would be required. If this could be achieved, it would mark a major breakthrough for the sciences of geology, geophysics, and seismology.

Enormous technical difficulties still would have to be overcome, the chief one of which would be to keep the drilling ship in one position over the hole. It is not our purpose here to discuss these difficulties, which have been amply covered in the popular press. Suffice it to say that the AMSOC committee reported that the project could be accomplished.

Two sites were chosen which fitted all the technical requirements of depth to the Moho, sea conditions, weather conditions, and the like. One is near Guadalupe Island, south of Los Angeles. The other is in the Puerto Rican Trench, about 120 miles north of San Juan, Puerto Rico. It was decided that preliminary test runs would be made at the former site, and the final drill hole probably placed at the latter. For these purposes the drilling ship, Cuss I, was modified for deep sea drilling.

Although the primary objective of the project is, as we have said, to settle the question of the composition of the earth's mantle rock, this is by no means the only aim. On the way down to the Moho, sedimentary materials on the ocean bottom will also be sampled. Deep oceanic sedimentation is extremely slow, and a few feet of sediment can represent many millions of years of time. Scientists have long asked the question: just when did the first seas form? Examination of sedimentation samples may finally make it possible to determine the age of our oceans. Farther down, it should also be possible to verify the existence of the basaltic layer at the base of the earth's crust.

Further, very accurate density measurements of mantle rock will enable us to judge the density of the earth's core with greater accuracy than in the past. At the same time, an age determination of mantle rock samples should tell us if the Moho does indeed mark the primordial earth's surface.

Gases seeping into the hole can also be collected and will yield information about the composition of deeper levels yet. Heat flow, temperature, and heat conductivity can be measured with great

accuracy. Thus we can obtain a better idea of the actual temperature nearer the core. So far, all deep earth temperatures are guesses based on values obtained on the continents.

Magnetic, electrical, and radioactive properties at the bottom of the hole can be accurately measured to provide data in the study of the earth's magnetic field, and of the weak electrical currents that are known to move through the earth.

Furthermore, we will be able to judge accurately the meaning of meteorites. We have assumed that they represent a shattered planet's interior. They may not.

Several other highly technical aims could also be listed. Clearly, the data obtained from the Mohole project will provide earth scientists with fuel for larger, more meaningful, research projects for years to come.

In March of this year the preliminary test runs off the coast of southern California were successfully completed. Anchored in water three miles deep, the Cuss I drilled three test holes, one to 1,043 feet below bottom, the second to 601 feet, and the third to 460 feet. Although the results are not yet completely evaluated, we may list their highlights. The sediments just below the bottom are fossil rich and from them the sedimentation rate of 8/10 inches per thousand years was determined. Heat flow is much higher than anticipated. Magnetic and seismic data were obtained. And finally, on April 1st the drill cut the last of the sediments and pierced for a distance of sixty feet into actual, lower crustal rock, which is basalt—just as predicted.

Another year of preparation must pass before the attack on the mantle can take place.

The objectives of the Mohole project are aimed largely at the acquisition of scientific information. In reality, this is also the major driving force behind our present rocket and space program. As that program yields by-products of military value, so the Mohole project has a major economic significance. Deep sea drilling for petroleum and minerals has never been attempted by individual companies because of the technical difficulties involved. But as a result of the engineering solutions derived from the Mohole project, which will be available to anyone interested, the next ten years may bring the first really deep off-shore oil operations. In terms of expense, it might be added, the entire Mohole operation will cost about the same as five rocket firings.

In closing, we might list one final objective of the project. It is the same purpose which led men to climb Mount Everest, to cross an ocean in 1492, and which today urges them on to the moon—plain curiosity!

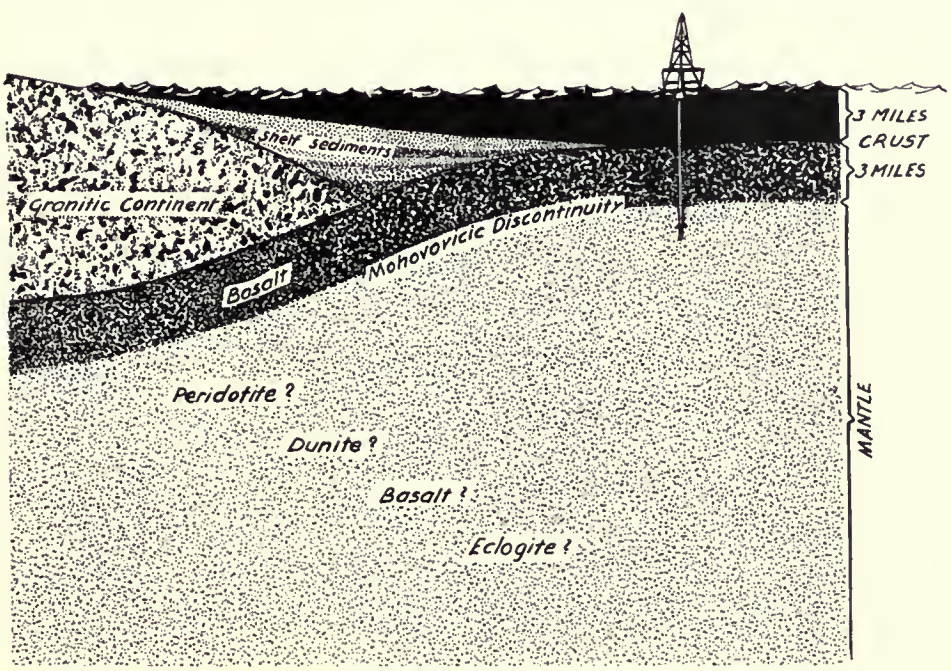

Fig. 2

Illustrations by Maidi Wiebe, Geology Artist

MUSEUM NEWS

(*Continued from page 2*)

the Bernice P. Bishop Museum (Honolulu, Hawaii), with the cooperation of the University of Hawaii.

While in Hawaii, Dr. Force will engage in research at the Bishop Museum in connection with a Grant-in-Aid of Research awarded him by the Social Science Research Council. The grant, extending from January 1961 to December 1961, was provided for Dr. Force's study of kinship and social organization in the Palau Islands. Chicago Natural History Museum is also contributing funds for the research.

An article entitled "The Arts of Oceania" by Curator Force appeared in the spring issue of *The Delphian Quarterly*.

Mr. William D. Turnbull, Assistant Curator of Fossil Mammals, and Mr. Orville L. Gilpin, Chief Preparator of Fossils, attended the Ninth Field Conference of the Society of Vertebrate Paleontology held in Nebraska. The Conference meetings were held at a number of localities throughout the state where important Cenozoic fossil deposits have been found.

New Fall Hours

Beginning September 5 the Museum will be open from 9 A.M. to 5 P.M. seven days a week. These hours will prevail through October. Museum hours September 1 – 3 will be 9 A.M. to 8 P.M., and on Labor Day (September 4) the doors will be open from 9 A.M. to 6 P.M.

In Memoriam

The Museum notes with regret the death on July 19, 1961, of Peter Letang, a cabinetmaker, who had been in the service of the Museum since July of 1930. Mr. Letang, a Hungarian by birth, possessed unusual skill in his chosen trade, and many of the display cases now in use at the Museum are examples of his craftsmanship. He will be greatly missed by his co-workers and friends.

"CEUD MILE FAILTE . . ."

A Hundred Thousand Welcomes to September's Featured Exhibit—

"Plant Dyes and Scottish Tartans"

THE ORIGIN of the Scottish tartans is lost in antiquity, along with the identity of the sea-faring Picts and the Caledonian land-dwellers who together eventually made up the greater part of the community of the Pictish nation. The ninth century saw the Picts finally dominated by the Dalriadic Scots (of obscure Celtic origin), the spread of the Gaelic language, and the early structure of clanship.

The word "clan" (*clanna* in Gaelic) means children, and was the name applied to a group of kinsmen united under a chief, claiming a common ancestry, and living as one great family on the lands they possessed. The clans rose to prominence in the thirteenth century and the system was not broken until 1746, when, following the Highland defeat and massacre at Culloden, the English sought to destroy the old clans by forbidding the Scot to wear the kilt and the plaid, because, to the Highlander, the tartan was a symbol of racial dignity.

According to the Norwegian saga of Magnus Barefoot, Magnus returned from an expedition to the Hebrides in 1093 to introduce into Norway the dress then worn by the men of the Western Isles, which was "a mantle and kirtle" (the plaid and tunic), "the legs . . . being uncovered." There is also a drawing, supposedly made in 1306, of a clan chief clothed in tartan trews (close-fitting breeches), kilt, jacket and skin sporran (purse). The historian, John Major, described in 1512 the costume of the Highland Scots as "a saffron shirt of linen and a loose garment made of several folds of many-colored woolen material called tartan, which was worn about the shoulders or folded over one shoulder and then girded about the body with a leather belt." This girded garment reached to the knees and was called the plaid (pronounced plade, as our pronunciation and use of the word "plaid" is unknown in Gaelic or in Scots). The saffron shirt went out of use around 1600 and only the belted-plaid was used. By 1725 the little kilt was popular.

The individual clan tartans had developed regionally in direct relation to dye-plants growing in the areas owned by the various clans. Each clan had its own distinctive "sett," as the pattern of the tartan is called. The cloth was woven by the women-folk from the soft wool of Highland sheep. Yarn for the cloth was colored with homemade vegetable dyes with the use of mordants such as fir clubmoss and woad. Alum, which was also used, tended to give a harsh feel to the cloth whereas the plant mordants retained the original softness. The weavers used measuring sticks on which were wound the exact number of threads of each color to be used. A web of tartan on the loom is two feet, two inches wide, so that the actual size of the pattern may vary but the color divisions relative to one another must be kept to scale.

Dyes were obtained from whatever plants were most abundant in the area that was home to the clan. Therefore, if the predominant color in a tartan is bright crimson, the clan probably inhabited a district where the lichen *Lecanora* was plentiful. If the predominant color is dark blue, blackberries were abundant there; if deep yellow, the clan lived on slopes and hills where the bracken fern grows; if green, the clan home was in a high, craggy district where broom and whin are abundant.

Although the proscription of tartan was rescinded in 1782, the method of preparation as known to the old Highlanders had almost become a lost art. When a generation had passed away and the Highlanders were again permitted to wear their national garb, those who had known the secrets of preparing the dyes and the old weavers who had known the secret "sett" patterns were gone. In many instances the sett-sticks had been destroyed or were lost. This accounts for the differences sometimes found in the sett patterns of the same clan. Fragments of tartan found on the field of Culloden which have recently been reproduced may be recognized as belonging to a certain clan but the colors and even the sett differ somewhat from the later pattern. Of course, a third difference occurred in color brightness due to the modern use of synthetic rather than vegetable dyes.

Other variations were deliberate. "Dress" tartans appeared when it was felt that the family tartan was not bright enough for impressive occasions; "hunting" tartans, of darker pattern, arose when the clan dress was too bright for camouflage on the heather moors.

After the restoration of the tartan in 1782, the identity-concept of the clan tartan revived with renewed energy. Every chief and clan wanted to resume "their" tartan, and the former local or tribal tradition came to have conscious precision. The tartan became invaluable for preserving the clan as a community at a time when industrial changes tended to minimize family activities.

The pageant of mankind has always been a colorful one. Man's innate love of color has been expressed in all ages and cultures largely through the use of plant pigments. The Museum's featured exhibit for September, in Stanley Field Hall, illustrates some of the plant sources of these pigments. In addition, it displays a map of Scotland locating all the clan territories, and includes samples of many of the better known tartans. When a part of this exhibit was recently introduced on Members' Night, it was interesting to note the number of people who mentioned a Scots ancestor and who searched eagerly among the many samples displayed, for "their" tartan. Even though we do not all have a Scots granny, we can still admire the colorful tartans and recognize that they are interwoven with *cuimhne nach teid as*, "the memory that will not fade!"

DOROTHY GIBSON

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CHICAGO
NATURAL
HISTORY
MUSEUM

Bulletin

GEMS FROM THE URALS

Featured Exhibit for October

Beryl—Aquamarine: Ural Mountains
Uncut stone, 1545 carats
Cut stone, from the Hope Collection,
339.91 carats

Volume 32
Number 10
October 1961

CHICAGO NATURAL HISTORY MUSEUM *News*

Children's Films

October 7—The Miracle of Trees
(from the giants of all living things, the sequoias, to the commonest of our shade trees)

October 14—Savage Splendor
(a brilliant parade of wild life in the African jungle)

October 21—Hibernation
(how living things get ready for winter)

October 28—Niok
(the story of a baby elephant in tropical Cambodia)

James Simpson Theatre. Saturday mornings at 10:30. Free.

"Trees"—Fall Journey

The "forest" of North American trees on exhibit in Hall 26 will be explored this month and next by children taking the Museum's new fall Journey, "Trees." The Journey focuses particularly on trees common to the Chicago area—some well-known like the sugar maple and American elm; and others not so familiar, such as the chestnut, shagbark hickory, and sassafras. The Journey may be taken any time during regular Museum hours through the month of November. Successful completion of "Trees" credits the "journeyer" with points leading to special awards. Instructions and questionnaires are available at the Information Desk and at the north and south entrances to the Museum.

Special Exhibit of Bird Paintings

"Birds of Greenland," an exhibition of 52 watercolors by Danish artist Gitz-Johansen, picturing birds that nest in that northern island outpost of Denmark, will be displayed in Stanley Field Hall October 1 through 22. This special showing of Gitz-Johansen's work has been made available to Chicago Natural History Museum through the generosity of the American Scandinavian Foundation. The exhibition is sponsored by the Embassy of Denmark and the Carlsberg Foundation of Copenhagen.

"Pintail," by Gitz-Johansen.

In his watercolors Gitz-Johansen, called "the finest painter of birds . . . since Audubon," has tried to reconcile ornithological exactness with "the painter's artistic conception, in order that birds and scenery should form together an artistic whole." The backgrounds of the paintings, therefore, show the striking scenery of Greenland while at the same time the birds, meticulously and colorfully done, are the dominant feature of the paintings. The watercolors were originally used as illustrations for an exceptional volume on Greenland birds by the noted expert, Dr. Finn Salomonsen. The book is also on display.

Audubon Lecture

The Illinois Audubon Society's 1961–62 series of free nature screen-tours begins in the Museum on October 22 with "An Ozark Anthology," the absorbing film story of Leonard Hall's famous "Possum Trot Farm" in the Missouri Ozarks. Hall will narrate the film in person, with mountain music and the sounds of animals providing background for his commentary. The program begins at 2:30 P.M. in the James Simpson Theatre.

Chicago Natural History Museum
Founded by Marshall Field, 1893
Roosevelt Road and Lake Shore Drive, Chicago 5
Telephone: WAbash 2-9410

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Members are requested to inform the Museum promptly of changes of address.

Concert Series Opens

Gerard Souzay, French baritone, will open Free Concerts Foundation's 1961–62 season with a song recital on October 24, at 8:30 P.M., in the James Simpson Theatre. The program will be the first of eight Foundation-sponsored concerts to be presented in the theatre in the coming months. Each will feature a well-known guest artist or artists. Free tickets for the Souzay recital can be obtained by sending a self-addressed, stamped envelope to Free Concerts, care of the Museum, Lake Shore Drive at Roosevelt Road, Chicago 5.

(*Continued on page 8*)

"Cat Street."
From Phil Walker's
"Hong Kong—
Bamboo Curtain Colony."

Travel Around the World with the Museum's

Adult Lecture Series

WHEN Phileas Fogg traveled "Around the World in Eighty Days" for the first time, the nineteenth century imagination was captivated by the delightful fictitious escapade invented by Jules Verne. Learning about the far countries and exotic peoples of the world has always excited man's interest. Today people are realizing that it is more important than ever before to know as much as possible about our neighbors in a world community drawn together by modern air and space communications. On hand to whisk Saturday afternoon audiences off on a "56-day" film trip around the world are several modern-day Phileas Foggs—well-known adventurer-lecturers who have roamed the globe with cameras at their sides. The motion pictures they have taken—all in color—will be narrated in person on the stage of the James Simpson Theatre each Saturday at 2:30 P.M., during the months of October and November. Reserved seats will be held for Museum Members until 2:25 P.M.

October 7—Hong Kong—Bamboo Curtain Colony

Phil Walker

Political bastion of the democracies of the Far East, warehouse port of Asia, gateway between East and West—this is Hong Kong! More than three million Chinese are housed in the less than ten square miles of this seaport and refugee base on China's border. Phil Walker, a former writer and producer for the National Broadcasting Company, in his second filming of this important citadel of the West, focuses on those areas of the Oriental city that stir the Occidental imagination—Victoria City and Kowloon, the Red China border, Aberdeen village and the floating restaurants, Repulse Bay, Portuguese Macao, and the ancient walled city of Kam Tin in the New Territories. In his ability to "see" the unusual in everyday human scenes, Walker makes a sampan wedding feast, squatters' villages, and a tour of Hong Kong Island as exciting as the Communist guards and the flag of the Chinese People's Republic at the Bamboo Curtain boundary.

October 14—Cyprus, The New Republic

Robert Davis

Cyprus, with a history 5,000 years old, has always been a meeting-place for many races and nationalities. Though for 82 years the island was controlled by England, Cyprus nonetheless has remained emotionally a part of Greece. Now, as a republic, it cherishes its legacy of Gothic cathedrals crowned by Turkish minarets, Byzantine chapels, and Roman palaces surrounded by Venetian fortifications. Although great strides are being made on the island in the direction of modernizing agriculture and industry, Davis's film shows that the small farm owner can still be seen using the picturesque, time-tested implements of his ancestors, and that in traveling across the Messoria plain one can yet hear the melancholy tune of the flute played by a lonely shepherd.

(*Continued on page 6*)

FEATURED EXHIBIT FOR OCTOBER

The lapidarists of the imperial jewel cutting and polishing industry at Ekaterinburg produced many carved *objets d'art* utilizing the massive or compact quartzes. In the piece shown below, a variety of small fruits and leaves has been cunningly reproduced in these colored quartzes, and set in a jasper base.

Cover: Some of the most precious stones known—emerald, aquamarine, and morganite—are species of beryl, a hard silicate of beryllium and aluminum. Beryl crystallizes in the form of long, six-sided prisms that may be colorless, or of blue, green, yellow, brown, and, rarely, pink hues. The richest deposits of beryl are found in Brazil, the Ural and Altai mountain ranges, and in parts of Europe and the United States. In the Museum's collection, beryl crystals are displayed both as they are found in nature, and as cut gems.

The objects shown above are of rhodonite. The color is a deep rose-red; hence the name of the mineral is derived from the Greek word meaning "rose." The Museum's collection of gems from the Urals contains many rhodonite carvings.

"GEM

Photographs by

John Bayalis and Homer

Topaz crystals are distinguished by the vertical striations on their surfaces and their characteristic cleavage pattern. Usually sherry-yellow in color, crystals of pale blue or green, or without color, also occur.

Right: Topaz crystals and cut gem (166.85 carats) of light blue.

S FROM THE URALS"

ıldren

THE granitic caverns of the Ural Mountains yield some of the richest known deposits of precious metals and gems. As early as 1721, gold and platinum were mined in the Uralsk area, and later Catherine the Great established a world-famous jewel-cutting industry at Ekaterinburg (now Sverdlovsk). From the imperial factory flowed a stream of exquisite lapidary art —faceted gems, such as diamonds, emeralds, rubies, and topazes; and *objets d'art* sculptured from semi-precious stones. An outstanding collection of these gems and gem carvings is on display in the H. N. Higinbotham Hall (Hall 31) as the Museum's featured exhibit during November.

The earliest known examples of gem cutting and carving are the engraved seals of the ancients. The Babylonians and Assyrians employed a cylindrical or "rolling"seal; the Egyptian seal was scaraboid—a form that was adapted for their own use by many other ancient peoples. During early imperial times, the familiar seal ring was developed by the Romans. The gem-stones most commonly used for seals were the massive and compact varieties of quartz, such as jasper, sardonyx, chalcedony, carnelian, and agate. Script, or scenes from history and legend, mythology and daily life, were engraved in intaglio on the seal's surface. From the Museum's collection of gems from the Urals two modern seals carved from smoky quartz are shown above.

"To many men," wrote the elder Pliny in his encyclopedic work on natural history, "one gem suffices for the contemplation of all nature." Such a gemstone was the water-clear, crystallized variety of quartz known to the Greeks by a word meaning "clear ice," and to us as rock crystal. The style of gem cutting employed by the ancients was *en cabochon*—that is, smoothly rounded—or gems were fashioned into drilled beads. By the 10th or 11th Centuries a modified cabochon style was developed that foreshadowed the faceted cut invented in the 14th Century and now generally employed for precious stones. Intaglio had been the form of engraving used since Sumerian times (c. 4,000 B.C.) for seals. The Greeks introduced the art of cameo—the converse of intaglio—for purely ornamental and decorative purposes. In every historic period down to the present, the transparent quartzes—rock crystal, smoky quartz, amethyst, citrine, and others—were used for many forms of sculpture and engraved work. The lapidarists of Ekaterinburg were masters of this art; on this page are shown, as examples of their work, a portrait bust of the Russian writer, Ivan Turgenev (*above*), the head of a horse (*center*); and a warrior (*far left, above*)—all carved in rock crystal.

P. R. NELSON

(*Continued from page 3*)

Adult Lecture Series

October 21—Devil's Highway

John M. Goddard

Seventeen hundred miles of treacherous water and breath-taking scenery—this is the mighty Colorado, America's most dangerous river. John M. Goddard, a professional explorer, traveled the river's entire length in a rubber life raft to produce a film record charged with excitement. When a short segment of "Devil's Highway" was presented on the television show, "I Search For Adventure," it was immediately chosen the most outstanding program of the series. Reasons for its selection are such scenes as Goddard's near fatal plane crash at the river's source, 8,000 feet high in the Rockies; the exciting discovery of a new natural bridge in the wild, unmapped plateau country of southern Utah; a spectacular cloudburst in the heart of the World's Eighth Wonder, the Grand Canyon; a visit to the Shangri La of America, the remarkable canyon village of the Havasupai Indians; and the collecting of magnificent botanical specimens.

October 28—Heart of the Wild

Cleveland P. Grant

Anyone who has seen Walt Disney's "Vanishing Prairie" is sure to remember the memorable scene in which two bighorn mountain rams lock in a furious battle. Cleveland Grant was responsible for the filming of that sequence. Now, in his own full length film, "Heart of the Wild," Grant goes beyond the bighorn combat to the dramatic story of the bighorn harem, the harem masters, and their raiding parties. Grant and his wife spent many months in some of the northern hemisphere's finest wilderness areas to film his nature story, including the waterfowl marshes of Manitoba and the more remote ranges of the Rockies. There they recorded the intimate stories of trumpeter swans and Canada geese; canvasback, redhead, lesser scaup, and ring-necked diving ducks; mallard, pintail, gadwall, and a host of nature's other wild creatures.

November 4—"Zanzabuku"

Lewis Cotlow

"Zanzabuku," or "dangerous safari," was filmed against the grandeur of Mount Kilimanjaro. It is a record of the never-ending drama of life and death in Africa, a continent of fascinating animals and ritualistic tribal life. The film begins at the home and animal stockade of Kenya's great game collector, Carr Hartley, at Rumuruti. There Hartley maintains a Disney-like menagerie of playful hat-snatching hyenas, baboons that steal candy bars, cigarette-eating antelopes, and monkeys whose curiosity about cameras constitutes one of the minor menaces to the expedition. From Rumuruti we travel on to Uganda and then to the Belgian Congo. Encountered along the way are Masai warriors, fierce Turkana tribesmen, and diminutive Pygmies who built for the filming crew a bridge of twisted vines across a river infested with crocodiles. It is the marvelous game country of Tanganyika, however, that provides some of the most unusual scenes in the film—a witch-doctor whose ear lobes are so stretched that a baby can be passed through the holes in a primitive form of baptism; and a tragedy of nature, hundreds of hippopotamuses dying under the blazing sun in drought-dried stream beds.

November 11—Three Worlds of Peru

Eric Pavel

Eric Pavel believes that the best insight to a country is through a knowledge of its people. Scenery is the backdrop for the human panorama. "Three Worlds of Peru," therefore, is the dramatic film story of three different phases of Peruvian life—its modern society, its Indian life, and its antiquities. Representative of modern society is Lima, Peru's capital, a city with functionally designed buildings and splendid homes. Indian life is presented in a visit with the Yagua people, sharpshooters whose children play with wild animals and whose young girls paint their bodies and faces red. For antiquities the film focuses on Machu Picchu, the archaeological capital of the Americas, whose temples, buildings, sundials, forts, aqueducts, pools, and terraces make it an unforgettable highlight in a film packed with memorable scenes.

Indian girl from the Upper Amazon. From Eric Pavel's "Three Worlds of Peru."

November 18—A Story of Spain

Karl Robinson

Spain's cultural heritage is enriched by the many diverse peoples who at various historic times have dominated the Iberian Peninsula. The Moors, for example, contributed a legacy of culture from the most advanced civilization of its day. Although modern Spain is moving with the times, there remain many picturesque back eddies of time still preserved in its national life. Karl Robinson has incorporated this diversity of history and customs in his human-interest portrayal of the Spanish people and their country. No bull fight enthusiast, Robinson focuses his camera, instead, on visits with Spaniards in their homes, at work, and at play. The film also ranges

over many of the most pictorial areas of Spain, including Madrid, Toledo, Segovia, Sevilla, Granada, Pamplona, Llivia, Montserrat, Barcelona, and the north coast.

November 25—New Zealand

Nicol Smith

In May of this year Chicago Natural History Museum opened a new hall devoted to the cultures of the Polynesian and Micronesian areas of the South Pacific. Outstanding in the hall are the exhibits of rare materials from New Zealand, including intricately carved objects made by the original inhabitants of the area, the Maoris. In this final program in the Museum's fall lecture series on travel and natural history, it is the islands of New Zealand that are explored by Nicol Smith. The country's scenery, its resources, its industry, and its people all are subjects of his roving camera. From the luxuriant forests to the mountains that provide a playground for skiers, to the maze of mountain lakes and valleys known as fiordland, "New Zealand" is sure to charm its audience with a brilliant procession of scenes. Many viewers will want to complete their "journey" to the islands by visiting the Museum's new hall (Hall 7, ground floor, east), where they may enjoy a closer look at the art and industry of the Maori people.

M. K. JINDRICH

Guide Kiri gives Nicol Smith a warm Maori greeting. From "New Zealand." The Maori council house in the background is similar to the one on display in the Museum's Hall of Polynesian and Micronesian Cultures (Hall 7). To greet Museum visitors, there stands just within the council house the life-like reproduction of a Maori chief, who wears, like Kiri, a colorful feather cloak.

FROM THE BOOK SHOP

Living Amphibians of the World

By Doris M. Cochran. Doubleday and Co., Inc.: New York, 1961. 199 pp., 77 photographs in color, 143 in black and white. $12.50.

This is the most recent volume in *The World of Nature Series*. The dust jacket claims that the book includes " . . . the most beautiful and informative pictures of amphibians ever assembled." For once I find myself agreeing with the superlatives in an advertisement. As a coauthor (with the late Karl P. Schmidt) of *Living Reptiles of the World* in the same series, I can testify that the photographs sell these books. Why else would so many people tell an author, "Your book is beautiful"? If the pictures sell these volumes, then Dr. Cochran's book should have an outstanding sale, for the photographs are both spectacular and esthetically pleasing.

The text prepared by Dr. Cochran, who is Curator of Reptiles and Amphibians at the United States National Museum, consists of a survey of the families of living amphibians of the world, a special section on the biology of amphibians, and a section on the keeping of amphibians in terraria and aquaria. The survey is indeed world-wide and Dr. Cochran has attempted to discuss the way of life of not only common creatures such as the tiger salamander and bullfrog, but also many little-known groups of amphibians, such as the limbless, burrowing, worm-like caecilians.

Unfortunately the text is marred by many minor errors. The professional herpetologists will be aware of these mistakes but the lay reader will not. Despite this defect the general reader will find this a useful as well as beautiful book because the amount of information far outweighs the misinformation.

ROBERT F. INGER
Curator, Amphibians and Reptiles

How to Know the American Marine Shells

By R. Tucker Abbott. Signet Key Books (No. 375): New York, 1961. 222 pp., 12 color plates, numerous text figures. Paperbound, 75c.

Two innovations distinguish Abbott's pocket-sized volume from the seemingly endless parade of shell books appearing on the market. First, among the twelve well-reproduced color plates are four devoted to illustrating living mollusks in their natural habitat. Second, for the first time in any shell book that I am aware of, a digest of shellfishery laws is included. The amateur collector needs to be aware of the fact that in some states the collecting of *any* live mollusks, whether of commercial importance or not, without a license is forbidden by law.

Dr. Abbott, who is Curator of the Malacology Department of the Philadelphia Academy of Sciences, has managed to pack a surprising amount of information in his 222 pages. Included are 31 pages on the natural history of mollusks; 16 pages on collecting, identifying, and arranging a shell collection; six pages on how to organize a shell club; 135 pages of descriptions of 403 of the more com-

(*Continued on next page*)

(*Continued from previous page*)
mon mollusks of the Atlantic and Pacific coasts of the United States; a locality index for the described forms; a glossary of conchological terms; a list of books on American mollusks; and a general index to subject matter, common, and scientific names. The price as given above is not a misprint; the book does indeed sell for 75 cents at the Museum Book Shop.

ERNEST J. ROSCOE
Division of Lower Invertebrates

MUSEUM NEWS

(*Continued from page 2*)

In Memoriam

Dr. Fay-Cooper Cole, noted anthropologist, who was a Research Associate and former full time employee of the Museum, died at Santa Barbara, California, on Sunday, September 4, 1961.

Dr. Cole was a native of Plainwell, Michigan, and attended Northwestern University, the University of Berlin, and received his Ph.D. degree at Columbia. He also held honorary degrees from Northwestern University, Beloit College, and the University of Chicago.

Dr. Cole joined the staff of the then Field Museum of Natural History in 1904, and continued with the Museum until 1923. He was then elected by the Trustees to the honorary position of Research Associate.

While at the Museum, Dr. Cole conducted expeditions to the Philippine Islands in 1906–1908, and in 1910–1911. His publications at the Museum include treatises on *Chinese Pottery in the Philippines* and ethnological studies on the Wild Tribes of the Davao District, Mindanao, and on the Tinguian and the Bukidnon in the Philippine Islands.

On leaving the Museum, Dr. Cole joined the faculty of the University of Chicago and served as Professor and Chairman of the Department of Anthropology from 1927 to 1947. After his retirement, he served as Visiting Professor at the University of Indiana, University of Washington, University of Mississippi, and Cornell University, in addition to making certain independent studies. Dr. Cole was a Past President of the Adventurers' Club of Chicago, the Chicago Geographical Society, and the American Anthropological Association. He served also on the Board of the Santa Barbara Museum of Natural History.

Expeditions

Barotseland, a British Protectorate in Northern Rhodesia, is the destination of Melvin A. Traylor, Associate Curator of Birds, who departed on September 27 for a collecting expedition of several months' duration for the Museum's Division of Birds. The expedition is being supported jointly by the Museum and the National Science Foundation through a $10,000 grant awarded Traylor for continuation of his research on the birds of west-central Africa. The results of his researches are being published by the Companhia de Diamantes de Angola, through its Museu do Dundo.

The last complete list of the birds of Northern Rhodesia was compiled in 1881. The area is of special interest to zoologists because it is the meeting ground of four of the African faunal districts. A study of the relationships among representative forms of the different animal species found along the boundaries of these districts is expected to increase significantly the scientist's understanding of the evolution of many African animals.

While in the field, Mr. Traylor will be accompanied by two native collectors from the Game and Fisheries Department of Northern Rhodesia. Bird specimens obtained on the expedition will be added to the Division's research collection, numbering over 280,000 skins.

Recently returned from a two-months' botanical expedition to the Northwest Territories of Canada, John W. Thieret, Curator of Economic Botany, is now busy at the task of interpreting the scientific data collected while he was in the field.

Focus of the expedition was that region of Canada now made accessible by the newly constructed Yellowknife Highway, located in the southwestern District of Mackenzie, Northwest Territories. The Yellowknife Highway is an extension of the Mackenzie Highway leading to the gold-mining town of Yellowknife. On its way, it cuts across terrain whose botanical features have never before been studied or recorded.

This summer's trip to the Northwest Territories was the third for Dr. Thieret. He made similar journeys in 1958 and 1959 and intends to return in 1962 to conclude the field work. This year, Dr. Thieret was accompanied on his field study by Robert J. Reich, former Custodian of the Herbarium and now a student at Indiana State Teachers College, who also assisted in the 1959 collecting.

Thieret's initial research on the plant life of the Northwest Territories led to his obtaining a National Science Foundation grant for the continuation of the study.

Dr. Rainer Zangerl, Curator of Fossil Reptiles, Dr. Eugene S. Richardson, Jr., Curator of Fossil Invertebrates, and Mr. Bertram G. Woodland, Associate Curator of Petrology, spent several days in Parke and Fountain counties, Indiana, where Drs. Zangerl and Richardson have been engaged for several years in research on ecologic conditions in an ancient sea. During this trip they studied profiles of rock strata to determine the areal extent of the environment in which large numbers of sharks were fossilized, and Mr. Woodland initiated a study of "cone-in-cone" structures—deformation features that resemble concentric cones and that occur in limestone or shale as the result of pressure.

Scientific Meetings

Dr. Hoshien Tchen, consultant for the Department of Anthropology's East Asia collection, returned from Taiwan last month. He attended the second session of the Yangmingshan national forum dealing with Chinese cultural and educational affairs. Participants in the forum were restricted to the leading Chinese scholars and civic leaders of Taiwan, as well as outstanding Chinese scholars from abroad. After Taiwan, Dr. Tchen's plans included a trip to Japan to continue his studies of Japanese culture and Sino-Japanese relations.

Dr. Robert H. Denison, Curator of Fossil Fishes, attended the Gordon Conference on Chemistry, Physiology, and Structure of Bones held at the Kimball Union Academy, Meriden, New Hampshire, during which he presented a paper on "Bone in Early Vertebrates."

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CHICAGO NATURAL HISTORY MUSEUM

Bulletin

Vol. 32 No. 11
November 1961

The
Department
of
Anthropology
Presents

A Special Exhibit

Photographs of rubbings on this page and cover
by the Division of Photography

Temple Rubbings from Thailand

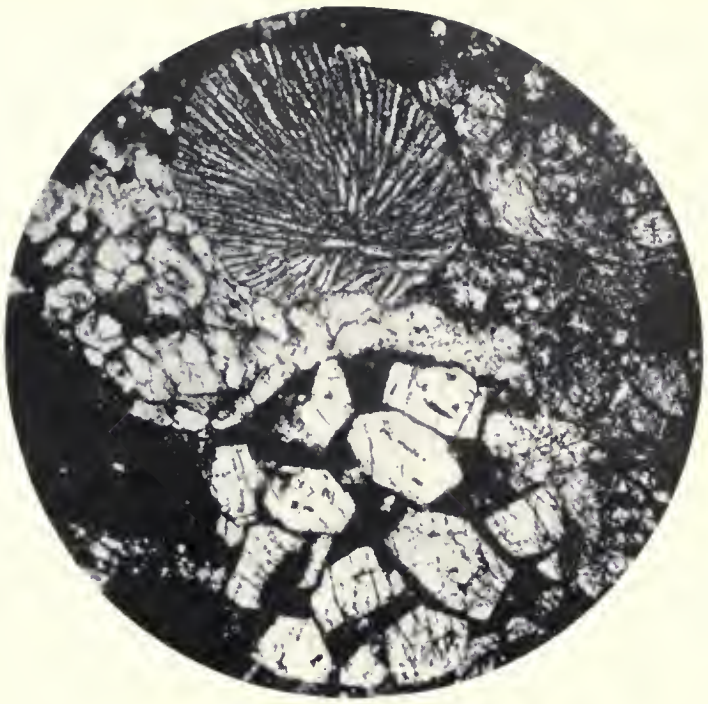
Rubbings in oil colors made at the Temple of the Sleeping Buddha Bangkok

By Vadna Gearhart

Stanley Field Hall
October 27 through November 26

From the Museum's Permanent Collections

THE FEATURED EXHIBIT FOR NOVEMBER . . .



MESSENGERS

FROM OUTER SPACE

"IT IS easier to believe that two Yankee professors will lie, than to believe that stones will fall from heaven." Such was the brusque and incredulous reply of a person of no less intelligence than Thomas Jefferson, then President of the United States, when he was told that Professors B. Silliman and J. L. Kingsley of Yale College had described a shower of stones as having taken place at Weston, Connecticut, in 1807. Jefferson was not the only skeptic; his views were shared by many of his contemporaries in both the arts and the sciences. The Tabor meteorite, which fell in Bohemia in 1753, was referred to as: *e coelo pluvisse creduliores quidam asseverant* (certain more credulous people asserted that "stones" had rained from the sky). The account of the fall of the Barbotan meteorite, which fell in France in 1790 after detonations and the appearance of a fire-ball traveling from south to north, was characterized as: "a recital, evidently false, of a phenomenon physically impossible," and "calculated to excite pity not only of physicists but of all reasonable people." Ernest F. Chladni (1756–1824), the German physicist and one of the pioneer students of meteoritics, writing in the latter part of the 18th Century, speaks of meteorites which were thrown away in his day by museum directors because they were ashamed to exhibit stones reported to have fallen from the sky.

Happily, while the "stones from the sky" were being scoffed at, Jean Baptiste Biot (1774–1862), the distinguished French physicist and astronomer, who accompanied Gay Lussac on the first balloon ascent to study the earth's atmosphere, was preparing a detailed report on the phenomena of the L'Aigle meteorite, which fell in France in 1803. The admirable thoroughness of the report at once made a tremendous impact and for the first time established beyond doubt the fact of the fall of stones from outer space. It also compelled many a doubting Thomas to give credence to reports that solid cosmic matter, not of terrestrial origin, does at intervals come to the earth.

Thus came the turning point, and stones that had been scorned and ridiculed became, overnight, objects of diligent search; extraordinary rivalry for their possession by public museums and individuals followed. The study of meteorites was put on a firmer basis and since then this study has been one of constantly widening interest. Today, with the program of exploration of outer space in full swing, this interest has taken an unprecedented leap. Far more physical scientists have joined the rostrum of meteoritics in the past decade and a half than all combined in the past century and a half. The reason for this eagerness is apparent: meteorites are portions of extraterrestrial bodies that come to us from the reaches of space. They are the only objects known to us from which we can draw information regarding the great outlying universe.

From the dawn to the end of the first

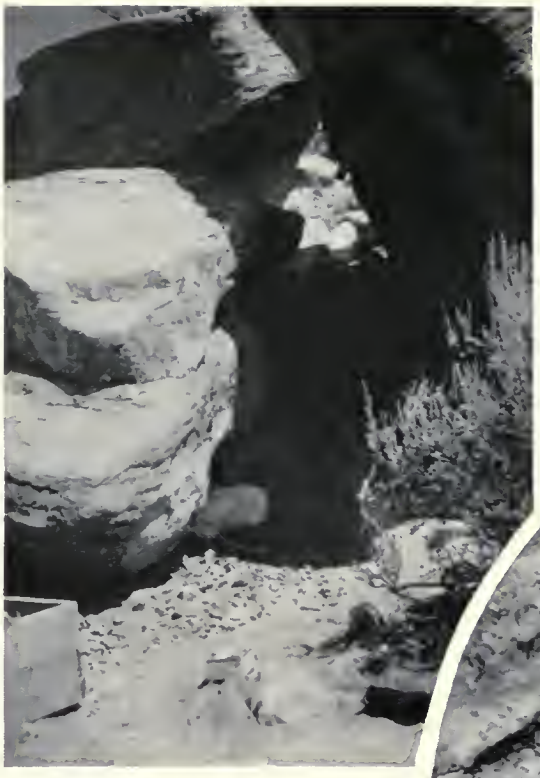
(*Continued on page 7*)

Above:
Microphotograph of a thin section of a stony meteorite, showing spheroidal bodies known as chondrules. Similar bodies are not found in terrestrial rocks.

William D. Turnbull

Assistant Curator

Fossil Mammals



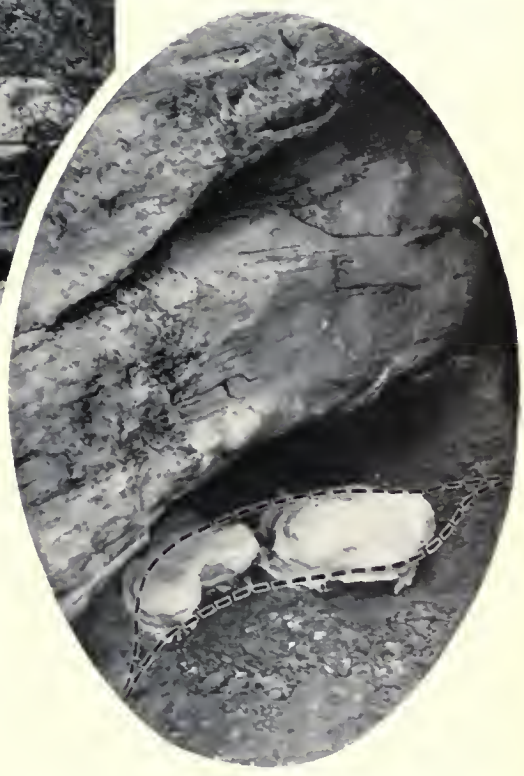


Figure 1: *View of carnivore den showing the massive sandstone tumble-blocks which protected the bone-filled lens of rock from rapid erosion. (Location of lens outlined in white.)*

A Fossil Carnivore Den

ONCE IN A LIFETIME, a truly unique concentration of fossils is discovered. This summer the Museum was fortunate in acquiring just such an accumulation of rare fossils, consisting of hundreds, perhaps thousands, of skull and jaw fragments, and an even greater number of post cranial pieces, which are remains of small mammals that lived during Early Tertiary time.

The bones were found in the DeBeque Formation of western Colorado, and were embedded in a lens-shaped body of limy clay, about four feet in diameter and four or five inches thick in the center. In addition to the abundant and diverse kinds of small mammals, lizard and bird bones have been recognized among the fragments. The most likely explanation for such an accumulation of small animal remains—broken and disarticulated as they were—is that it represents the den or roost of a carnivore or carnivorous bird. In this case, I believe the discovery to be a rare carnivore den.

Professor Bryan Patterson (formerly Curator of Fossil Mammals, now Agassiz Professor at Harvard and Museum Research Associate) in twenty years of collecting for Chicago Natural History Museum in the DeBeque Formation had never been lucky enough to come across such a concentration of small mammals. He did build up a splendid collection of larger fossil mammals and, while discovering many exciting materials, also made a number of enthusiastic friends for the Museum in the areas where he worked. It is one of these friends, Mr. Al Look, of Grand Junction, Colorado, who was responsible for our receiving notice of this present find, and for our opportunity to collect the specimens.

Over the years, Mr. Look has sent in to the Museum, or otherwise called to our attention, many interesting specimens. Last fall, following one of Mr. Look's talks on the geology and archaeology of western Colorado,[1] a young

[1] Mr. Look is the author of a popular book on the geology of the mountain states, "In My Backyard." Through his book and his popular lectures, he has done a great deal to interest westerners in the nation's geology.

member of his audience, Miss Sue Hill, introduced herself and showed him several tiny jaw fragments that she had found on her parents' ranch. Mr. Look needed no more than a glance to see that these fossils were unusual in that they came from a geologic formation that had previously yielded mostly large and medium-sized mammals. In this formation, the pantodonts *Leptolambda*, *Titanoides*, *Barylambda* and *Coryphodon*, the uintatheres *Probathyopsis* and *Bathyopsoides*, or the taeniodont *Lampadophorous* are the large forms to be expected. Medium-sized mammals such as carnivores, condylarths, primates, insectivores, and ungulates are also known, as Mr. Look knew. But only a few of the really small mammals had ever turned up—forms such as multituberculates, rodents, and the smallest of insectivores and primates. Mr. Look therefore immediately made arrangements for Miss Hill to show him the site of her discovery, near Rifle, Colorado. Their trip to the area coincided with a snowfall, and some snow removal was necessary before Mr. Look could dig out a somewhat larger sample of specimens. This he sent off to me.

On examining the specimens, I determined to collect, at the earliest opportunity, whatever material remained. During the second week in August, such an opportunity occurred; I joined Mr. Look in Rifle and was taken to the Lynn Hill ranch to meet Miss Hill and her parents and to see the locality which, by that time, had produced nearly 100 specimens.

The DeBeque Formation extends over several thousands of square miles of western Colorado in Rio Blanco, Garfield, Mesa, and Delta counties. Rifle lies at the eastern edge of this area where the DeBeque Formation is lapped onto the upturned Mesozoic sediments—the Grand Hogback (Figure 2)—which, in turn, flank the major upthrust structure of the Park Range further to the east. I discovered that tumbled blocks from a massive sandstone channel situated fifty to 75 feet higher in the section had protected the carnivore den site from rapid erosion, and that most of the bone lens was still intact under one of these truck-sized, tumbled blocks of rock (Figure 1). Once I made certain that there was no articulation or clear association among the jumbled mass of bone, it was a simple matter to dig out the entire lens with pick and shovel and to sieve a concentrate of bone and pebbles for shipment back to the Museum.

Even a brief, preliminary study of these materials confirms the significance of the find made by Miss Hill and Mr. Look. It has provided us with an unusual sampling (Figure 3) of a fauna of Early Tertiary time—a most interesting period in the evolutionary history of the placental mammals.

During this period most of the dominant mammals belonged to groups that had evolved from generalized stocks some ten million years earlier, and which had become extinct by the end of another ten to fifteen million years. Less conspicuous than the dominant mammals were small, generalized mammals. These were just beginning the second great placental adaptive radiation that led to most of the modern orders. The small, unobtrusive insectivores, primates, and condylarths of this discovery—species that were only tantalizingly suggested by a few specimens in the prior collections of the 1930's and 1940's—are representatives of early critical stages in the evolution of their respective lines. As such, the fossils from the carnivore den are certain to fill many gaps in our knowledge.

Figure 3: *Typical vertebrate bones from the den.*

Figure 2: *The Early Tertiary DeBeque Formation in which the carnivore den was found in the foreground. Mesozoic sediments comprising the Grand Hogback are in the background.*

Throughout the collecting, the Lynn Hill family was most cooperative and helpful. We thank them for their generosity in providing us with this important collection, and welcome them as new friends of the Museum.

CHICAGO NATURAL HISTORY MUSEUM *News*

Children's Programs

On November 18, the Museum's free motion picture for children, "The Twilight World," an exciting film story about deep-sea diving, will have a special attraction in the personal appearance of Donn Renn, sponge diver and Charter Captain of the Florida Keys. The program, like all the other free motion pictures presented each Saturday during November, will begin at 10:30 A.M. in the Museum's James Simpson Theatre. Following is the complete November schedule:

November 4—The Sea Around Us

The Academy Award film adaptation of the book of the same name by Rachel Carson

November 11—Family of Free China

The story of the life of a teen-aged Chinese boy on the island of Taiwan

November 18—The Twilight World

A true documentary report of deep-sea diving narrated in person by Donn Renn, a man who lives by and under the sea

November 25—Holiday Preview

Film stories about the legends that have evolved about animals associated with the Christmas season

Adult Film Lectures

The free illustrated lecture series for adults will also continue each Saturday during November, at 2:30 P.M. in the James Simpson Theatre.

November 4—"Zanzabuku"
Lewis Cotlow

November 11—Three Worlds of Peru
Eric Pavel

November 18—A Story of Spain
Karl Robinson

November 25—New Zealand
Nicol Smith

Staff Notes

Dr. Roland W. Force, 36, Curator of Oceanic Archaeology and Ethnology, has been appointed director of the Bernice P. Bishop Museum in Honolulu, Hawaii, effective January 1, 1962.

Roland W. Force

His new appointment will terminate a five-year association with Chicago Natural History Museum. Dr. Force came to this Museum in 1956 and since that time has been instrumental in expanding the Museum's oceanic collections. In 1958 he arranged for the acquisition of the famed Fuller Collection of artistic and ethnological materials from the South Pacific. Purchased from Captain A. W. F. Fuller of London, the collection is one of the finest in the world devoted to South Pacific artifacts.

In May of this year the Fuller Collection received special recognition when a new hall, "Cultures of Polynesia and Micronesia," (Hall F, ground floor, east) was opened to the public.

Dr. Force's research in the field of anthropology includes a study of political change, emergent leadership, and social organization among the peoples of the Palau Islands conducted during the years 1954 to 1956. This research was part of a broad program sponsored jointly by Yale University, the Bernice P. Bishop Museum, and the University of Hawaii. The result of this research was a monograph entitled *Leadership and Cultural Change in Palau*, published by Chicago Natural History Museum Press.

As director of the Bernice P. Bishop Museum Dr. Force replaces Dr. Alexander Spoehr, who was recently named chancellor of the United States' new East-West Center, an institution of higher learning founded in Hawaii to foster greater understanding between the oriental and occidental worlds. Dr. Spoehr, too, has been a member of Chicago Natural History Museum's scientific staff, having served, like Force, as Curator of Oceanic Ethnology from 1946 to 1952.

Dr. Force will be a guest on Irving Kupcinet's popular late-hour television show "At Random" on November 4. The Saturday night program begins after the late movie on WBBM-TV, Channel 2.

Dr. Patricio Ponce de Leon was appointed Assistant Curator of the Cryptogamic Herbarium effective November 1, 1961. Dr. Ponce de Leon, formerly Professor of Botany at the University of Havana, came to this country shortly after the Castro revolution in Cuba and has been working for some time in the Department of Botany at the Museum. Now a resident of Chicago, Dr. Ponce de Leon plans to continue his residence in the Chicago area.

Chicago Natural History Museum
Founded by Marshall Field, 1893
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Members are requested to inform the Museum promptly of changes of address.

Mr. Theodore Halkin has joined the Museum's staff as an artist-consultant for the Department of Anthropology's exhibition program. Halkin has exhibited nationally and internationally since receiving a Master of Science degree in art from Southern Illinois University in 1952. He has also obtained a Bachelor of Fine Arts degree from the Art Institute. Halkin has taught painting, drawing, and art history at Northwestern University and has lectured at the Art Institute. He is currently teaching in the Fine Arts Program at the University of Chicago's Downtown Center. Presently, he and Dr. Kenneth Starr, Curator of Asiatic Archaeology and Ethnology, are planning the renovation and reinstallation of the Museum's Hall of Traditional Chinese and Tibetan Civilization.

Mrs. Meta P. Howell, Librarian, and Mrs. M. Eileen Rocourt, Associate Librarian, attended the annual convention of the Special Libraries Association held recently in San Francisco. While in the area, the opportunity was taken to visit, among others, the libraries of the University of California at Berkeley, Stanford University, and the San Francisco Academy of Sciences. The following week Mrs. Howell toured the University of Arizona library.

Mrs. Paula R. Nelson, Public Relations Counsel, has accepted an invitation to join the Executive Committee of the Science Assembly of the Adult Education Council of Greater Chicago. The committee will plan a series of science programs to be presented to the general public by the Adult Education Council during the fall and winter months.

Mrs. Nelson is also a newly appointed member of the Education Committee of the Publicity Club of Chicago.

Dr. Donald Collier, Curator of South American Archaeology and Ethnology, delivered two lectures on ancient Peruvian archaeology at the University of Illinois in Urbana.

Free Concert

Free Concerts Foundation, in its second program of the 1961–62 season, will present a Koussevitzky Memorial Concert direct from its premiere performance in the Library of Congress in Washington. The program to be given in the James Simpson Theatre on Tuesday, November 21, at 8:30 P.M. is one of several events scheduled in many parts of the world in honor of Serge Koussevitzky.

Featured artists for the memorial concert will be the Festival Winds, a woodwind quintet, and Harriet Wingreen, pianist. Three years ago, this group recorded the Concerto for Piano and Woodwind Quintet by Wallingford Riegger, a work commissioned by the Koussevitzky Music Foundation and which will be heard at the November 21st concert. Other compositions to be performed are: Dialogues for Clarinet and Piano by George Rochberg; Eight Pieces for Unaccompanied Flute by Paul Hindemith; Three Pieces for Flute, Clarinet, and Bassoon by Walter Piston; and Duo for Flute and Oboe by Ginastera.

December Exhibit Preview

"Prehistoric Art of the Libyan Sahara," an exhibition of actual-size, watercolor reproductions of Neolithic Age rock paintings discovered recently in Africa, opens in Stanley Field Hall on December 1.

The paintings, which date from about 6,000 to 2,000 B.C., depict hunting scenes, tribal life, battles, and magic religious rites. They will remain on display in the Museum through January 2.

Winter Hours

Beginning November 1 and continuing through February, the Museum will be open to the public from 9 A.M. to 4 P.M. except on Saturdays and Sundays, when it will remain open until 5 P.M. On Thanksgiving Day, November 23, regular hours of 9 A.M. to 4 P.M. will be observed.

MESSENGERS—

(*Continued from page 3*)

quarter of the 19th Century, the spade work for the study of meteorites was done and the essential distinguishing features of meteorites were made out. Chemical investigation of various stony and metallic substances which at different times are said to have fallen on the earth revealed that nickel characterized most such specimens. It was also found that meteoric stones were made chiefly of silica and magnesia and that many of them contained certain spheroidal bodies or chondrules, which differ from any known terrestrial rock. It was further noted that the iron sulphide of meteorites was distinct from the terrestrial mineral, pyrite.

Almost contemporaneous with these findings came the discovery of the most interesting and peculiar structural feature of iron meteorites and one that distinguishes them from all terrestrial irons. The structure is displayed in the form of a network of intersecting bands known as Widmanstattian figures, so named after their discoverer, Alois von Widmanstatten of Vienna, who first observed them by heating a section of the Agram iron meteorite.

Thus the essential data for distinguishing meteorites from terrestrial bodies—the presence of nickel, chondrules in stones, and Widmanstattian figures in irons—were early at hand and it was possible to collect the "sky stones" even when they had not been seen to fall. Systematic efforts to collect meteorites, however, were not made for many years.

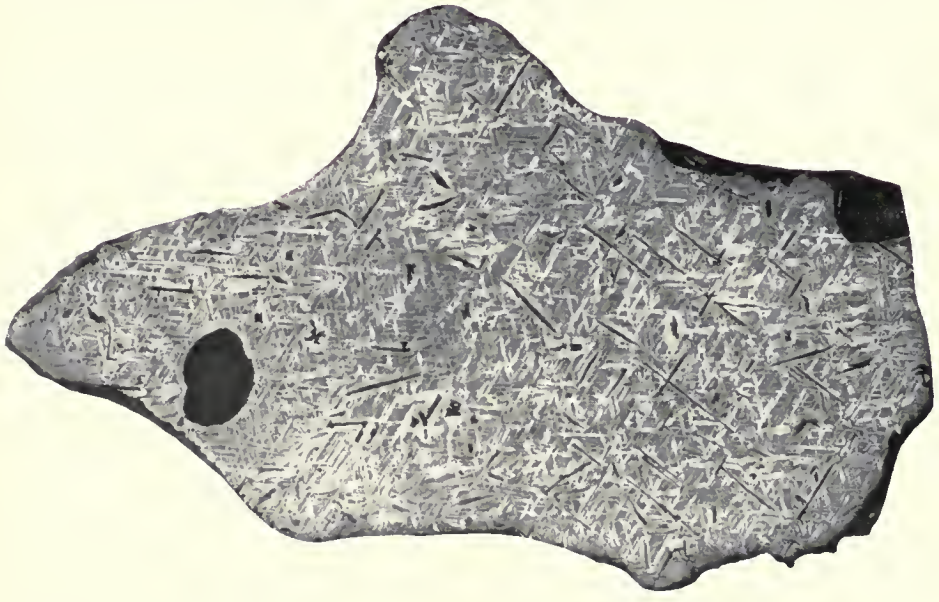
Even by the middle of the 19th Century the collections of the leading European museums, especially those of Vienna, Paris, and London, hardly represented more than fifty falls each. Greater interest in the subject, however, began to be aroused during the next two decades (1850–70), and meteorites began to be collected more rapidly. For many years, the Vienna collection remained in the lead, and its successive curators, Partsch, Hornes, Brezina, and Berwerth, were zealous students of the subject. We owe

(*Continued on next page*)

much of our knowledge of meteorites to the studies of the Vienna collection. The collection of the British Museum of Natural History was nearly as large—and is much larger now, its growth being favored by the acquisition of a large number of stone meteorites that fell in India and by the recent purchase of a portion of the Nininger collection. One of these Indian meteorites, Bustee, has yielded two minerals, oldhamite and osbornite, unknown in terrestrial mineralogy. As with the Vienna collection, the curators of the British Museum have been leading investigators, as the names of Maskelyne, Flight, Fletcher, Prior, Spencer, Campbell-Smith, and Hey will show; and happily, the connection of the latter two with this splendid study still continues. The meteorite collection of the Natural History Museum of Paris is likewise extensive and it is rich in French territorial meteorites. Included among these is a collection of thin sections of meteorites which is second to none in number and quality. The names of Meunier and Lacroix will be long remembered for their fruitful contribution to meteoritics through researches on the Paris collection.

In the United States little was done toward preserving meteorites, and many of our finest specimens went to Europe. ably, perhaps, I felt a sense of resentment. But I soon found comfort remembering that we, too, possess certain meteorites of unique interest and value that have not fallen in United States soil. Though the United States had a late start in the collecting of meteorites, it rapidly made up the lost ground, chiefly through the generosity of donors, by exchange, and by purchase. Apart from the fine, but relatively smaller collections at the Universities of Yale, Harvard, and New Mexico and at Amherst College, large collections of meteorites are today possessed by the Natural History Museums in Washington, New York, and Chicago. Thus the opportunity for comprehensive study of meteorites at these places is unrivaled.

Of nearly 1,500 meteorites on record about two-thirds are represented by specimens in Chicago Natural History Museum's collection. For some of the falls, a fragment or section serves as the representative. Many other falls are represented by complete individuals, and some of these are the only ones known. This collection was inaugurated in 1894 at the founding of the Museum by purchase of collections from George F. Kunz. Eighteen years later, the private collection of Henry A. Ward, numbering over 600 falls, was added. Instrumental in



Polished and etched section of an iron meteorite showing Widmanstattian figures—a distinguishing character of most iron meteorites.

I was a bit taken aback when I first saw some of these superb American meteorites in the Vienna collection and excus- this monumental acquisition, of which the Museum is justly proud, was my predecessor, the late Oliver Cummings Farrington, for 39 years Chief Curator of the Department of Geology. His interest in meteoritics, a name he himself

One of the individuals of the L'Aigle meteorite shower. The detailed report of the phenomena attending this fall first established beyond doubt that stones do now and then fall from the sky.

proposed, was so intense that he outdistanced his old masters in less than a decade and became one of the outstanding figures in the field—a status which he maintained until his death on November 2, 1933. Since then, many more falls have been added to the collection by exchange and purchase—the latter mainly through the magnanimity of President Stanley Field, whose interest in the Museum's welfare has been unflagging for over half a century.

Selected specimens from the Museum's meteorite collection, showing the principal kinds of meteorites and features of general interest relating to these cosmic bodies, are on permanent exhibit in the west end of Hall 35 on the second floor of the building. An interesting feature of these meteorite exhibits is the display of two falls—the "fall of the Benld meteorite" and the "fall of the Hamlet meteorite." Both exhibits show the path of the fall and the way the meteorites have struck buildings and the damage they have wrought. Actual damaged materials have been secured and are displayed. The exhibit on the fall of the Hamlet meteorite, which has just been completed, can be seen in Stanley Field Hall this month, and, together with the meteorite collection in Hall 35, is the Museum's featured exhibit for November.

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CHICAGO
NATURAL
HISTORY
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Bulletin

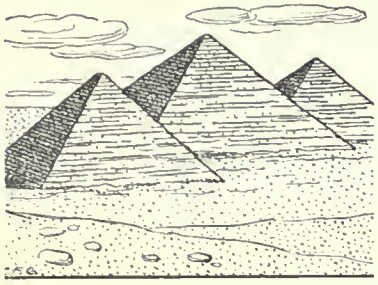
Isis, the earliest madonna
holds Horus, her son

DECEMBER EXHIBITS

Winter Fur 'N Feathers

Prehistoric Art of the Libyan Sahara

Volume 32
Number 12
December 1961



Paula R. Nelson

Cover by John Bayalis and Homer Holdren

ISIS: *Wife and Mother of the Sun*

For almost two millenia, the religion of ancient Egypt has claimed the interest of the nations of the West. When the once-powerful gods of Greece and Rome became shadowy philosophical abstractions with little hold on the people, a large part of the classical world turned to the ancient wisdom of Egypt. The obscure temple hieroglyphs, the obelisks and sphinxes before the shrines, the strange linen vestments of the priests with their shaven heads and faces, the endless, archaic ritual, and the animal forms of some of the idols, everywhere filled the classical world with peculiar awe. Wonderful mysteries seemed surely to be hidden beneath these incomprehensible externals. In particular, worship of the deities of the Osirian cycle of myths, which included the cult of Isis as the archetypal wife and mother, spread throughout the Roman Empire.

Osiris was one of the oldest of the great solar gods of Egypt. As king of the earth, he was aided in his government by his faithful sister-wife, Isis. A benefactor of men, and beloved as a righteous ruler, he nevertheless provoked the jealousy of his brother, Seth, and was craftily misled and slain by him. After great tribulation, Isis gained possession of her lord's body and reanimated it by means of her magic. Although unable to resume his earthly kingdom, Osiris passed down in triumph to the nether world, to become ruler of the dead.

On earth, Isis escaped the continuing persecution of Seth by taking refuge in the marshy fastnesses of the Nile Delta. Here her son, Horus, was born and secretly reared. Grown to manhood, the youth determined to become the avenger of his father. He pursued Seth, and in the ensuing awful battle, during which both were fearfully mutilated, Seth was finally conquered. Horus triumphantly assumed the earthly throne of his father. Unwilling to accept defeat, Seth then raised before the tribunal of the gods the question of the validity of Horus's claim to his father's throne. Defended by Thoth, the god of letters, Horus was vindicated and his position as ruler of the earth upheld. Thus Horus became for the people the embodiment of the qualities of a good son, and one who symbolized their hope in the ultimate triumph of the just cause.

But Horus not only inspired the living; he had also an important function to perform for the dead. In the nether world was the great hall of judgment, with its tribunal of strange daemonic forms before whom each dead person must appear to confess his sins. If the deceased could declare that he had neither stolen, nor committed adultery, nor reviled the king, nor committed any other sin; and if the great balance, on which his heart was weighed against the feather of truth, showed that he was an innocent person, he was acquitted of punishment. Horus then presented the worthy soul to his father, Osiris, and the deceased joined the nation of the blessed dead.

The bronze statue of Isis and Horus on this month's BULLETIN cover dates from about 600 B.C., a period when the religion of the Old Kingdom (2700–2200 B.C.) was being consciously revived under the Saite kings. Although earlier tomb-chapel reliefs portraying mythological subjects were frequently copied, the new portrayals of the gods had a more human and realistic quality. Portrait statues, for example, display a mastery of anatomical structure and a sure grasp of individual character. Similarly, in the cover photograph, the child, Horus, does not appear in the traditional upright posture of a miniature god, but as a real child, who will be nursed by his mother for the first three years of his life, and who has fallen asleep at her breast. Thus the sculpture, which is on exhibit in the Museum's Hall J, Peoples of Ancient Egypt, appears to foreshadow the later Coptic Christian treatment of the Madonna and Child theme.

Certain conventional symbols of the two deities, however, still remain. Horus wears the traditional short, plaited lock on one side of the head, a style that was copied in his honor by the children of royalty and sometimes by the family heir. The horns on the headdress of the goddess identify Isis with the sky, which is often personified in Egyptian mythology by a cow. The horns, together with the sun disk, symbolize her role as the heavenly wife and mother of the sun-god, with whom both Horus and Osiris are identified.

It was this cult of the great mother Isis which persisted as a powerful rival to rising Christianity during the first three centuries of the Christian era. Thereafter, Christianity spread more rapidly, and in the fourth century the closing of all pagan shrines was accomplished by Theodosius with the secure support of the masses. The sole exception was in Nubia, where certain nomadic tribes still refused to accept the Christian faith. The Roman government, which feared the raids of these barbarians and even paid tribute to keep them quiet, was forced to tolerate a few priests of Isis in the temple at Philae, at the southern frontier of the Roman province. Not until the beginning of the sixth century was the powerful Emperor Justinian able to suppress these remnants of paganism by closing the temple and imprisoning the priests.

With the death of the last priest who could read and interpret the "writings of the words of the gods," as the hieroglyphs were called, the old faith sank into oblivion. "It was only in popular magic that some superstitious practices lingered on as feeble and sporadic traces of what had been, a couple of centuries before, a faith which bade fair to become the universal religion. . . ." [1]

[1] W. Max Muller, "Egyptian Mythology," *The Mythology of All Races* (Boston, 1918), XII, 244. The above account is adapted largely from this source.

WINTER FUR 'N FEATHERS

A combined Featured Exhibit and Museum Journey for the whole family!

For those who have never had an opportunity to feel the skin of an elephant, gorilla, zebra, mink, black bear, moose, or white-tailed deer, Chicago Natural History Museum's featured exhibit for December—"Winter Fur 'N Feathers"—is a holiday "must."

For the first time, the popular Museum Journeys for children have been combined with the exhibit-of-the-month to make a unique holiday activity for the whole family. In it, animal coats that are adapted to meet different climatic and seasonal conditions will be shown, and samples of many kinds of skin and fur provided for visitors to touch.

To learn more about "Winter Fur 'N Feathers," visitors entering the Museum may pick up their Journey instructions at the Information Desk and then proceed to Hall 18 on the first floor, where a new three-screen exhibit has been especially prepared for December's combined program.

The exhibit draws on the Museum's comprehensive research collection of bird and mammal skins, which are usually displayed only once a year, on Museum Members' Night. In the first exhibit screen, with a background of yellow and a blazing orange sun, are skins of some of the mammals that have adapted to tropical living by having very short fur, such as the leopard and zebra, or very little hair, such as the elephant, whose hair is mostly concentrated in a tuft on his tail. In a second exhibit case, a blue background and red sun indicate a northern climate. Among the many animal coverings from cold regions displayed here are the pelt of a snow leopard from high in the Himalayas and the fluffy plumage of the Arctic snowy owl. Still a third exhibit screen shows the contrast between the winter and summer furs and plumage of animals living in temperate climates with seasonal changes.

(*Continued on page 7*)

PREHISTORIC ART of the LIBYAN SAHARA

THOUSANDS of years before the Christian era, when a tropical vegetation still covered the Sahara, a mysterious civilization flourished in the Acacus Massif region of southwest Libya. All that remains of this ancient culture is the magnificent rock paintings and carvings left behind when climatic changes and the encroaching desert presumably forced the inhabitants to abandon their native home.

The rock paintings and carvings of the Acacus, which date from about 6,000 B.C. to about 2,000 B.C., were discovered by Dr. Fabrizio Mori, who led four Italian expeditions to the area between 1955 and 1959. The paintings demonstrate an extraordinary artistic output and development. There are magnificent representations of herds of cattle; and human figures of refinement and elegance. The petroglyphs depict powerful and spirited scenes of buffaloes, rhinoceroses, giraffes, and elephants. Many important elements in the life of Neolithic Age peoples are shown—the hunt, tribal life, battles, and magic religious rites. Through this unique documentation, it has become possible partially to reconstruct the history of the great desert region of the Sahara.

To bring this important discovery to the general public, a remarkable exhibition—"Prehistoric Art of the Libyan Sahara"—has been organized by the Italian government and brought to the United States under auspices of the Italian Cultural Institute. The main section of the exhibition consists of more than twenty large panels—exact watercolor copies of the rock paintings, made in the same sizes as the originals by artist-members of the Italian expeditions. Added to these are eleven photographic panels of the petroglyphs, as well as maps and photographs of the Acacus and of the Italian expeditions. This exhibition has been made available to the Museum by the American Federation of Arts, and will be displayed in Stanley Field Hall from December 1 through January 2.

Many questions remain to be answered concerning the prehistoric art of the Sahara. Although five main epochs have been discerned, the chronology of the paintings and engravings has been difficult to establish. There are also surprising similarities between the various epochs of the Libyan art and the paintings and sculpture of Pre-Dynastic and Early Dynastic Egypt. Dr. Mori will soon return to the Acacus to begin excavations that he is convinced will reveal tangible remains of the prehistoric civilization of the Sahara now known only through its unique and splendid works of art.

PAULA R. NELSON

" . . . we . . . built a hut of poles and palm thatch for our headquarters."

SURINAM DIARY

For the past year, Mr. Harry Beatty has been collecting for Chicago Natural History Museum in Surinam (Dutch Guiana). His activities represent the first phase of the field study that the Museum is currently undertaking in that country; in the second phase of the work, Mr. Philip Hershkovitz, Curator of Mammals, will join Mr. Beatty in the field. Recently Mr. Beatty sent his diary to the Museum; the following excerpts from it have been prepared for the *Bulletin* by Dr. Austin L. Rand, Chief Curator of Zoology.

ON SEPTEMBER 30, 1960, I left Paramaribo, the capital, by plane, and flew to Kayserberg Airstrip, deep in the interior. The journey of 225 miles took one and one-half hours, thus saving four weeks of up-river travel by canoe. At 10,000 feet we passed above fleecy clouds, chains of mountains, unknown rivers, and rain forest populated only by wild life.

I have with me a Javanese cook, Sagiman by name, and a bush Negro who answers to the name, Napoleon. Both know well how to live in forest country. For camp we selected a place on a small river, the Zuid, in the forest, and built a hut of poles and palm thatch for our headquarters. It is now the dry season, which lasts September to December.

October 1: Our first night in camp. Howler monkeys congregated and all night they roared . . . the nylon bat net made one catch.

October 2: Collecting starts with the dawn light.

October 4: A red-headed woodpecker hammering on a dead branch awakened me. On the trail an agouti barked a danger signal, and we heard the strange calls of a lovely black and white hawk trying to find a tree frog, its favorite food. Along a dry creek were tracks of tapir and cat and peccary . . . a black spider monkey gave strange, whistling calls.

(*Continued on page 8*)

CHICAGO NATURAL HISTORY MUSEUM *News*

Free Concert

On Tuesday, December 12, Free Concerts Foundation will present Claude Frank, pianist, and the Lenox String Quartet in a chamber concert featuring the works of Beethoven, Carter, and Schumann.

The program, which begins at 8:30 P.M., will consist of Beethoven's "Trio, B Flat Major, Opus 11," "String Quartet No. 2" by Carter, and "Piano Quintet, Opus 44" by Schumann. For free tickets send a stamped, self-addressed envelope to Free Concerts, Chicago Natural History Museum, Roosevelt Road at Lake Shore Drive.

Audubon Wildlife Film

"Roving Three Continents," a color motion picture about biologist Bristol Foster's travels across Africa, Asia, and Australia in a Landrover, will be presented free in the James Simpson Theatre by the Illinois Audubon Society on Sunday, December 3, at 2:30 p.m. The film, concentrates on the rare animals, birds, and plants of the three continents, and will be narrated by Foster in person. It is the second in a series of Audubon wildlife programs to be presented in the Museum during the coming months.

Photographic Exhibit

Forty new photographs have been added to "People and Places in India," an exhibit of photographs and miniature clay sculptures on display in Hall 18 (ground floor, west). The new photographs, which replace the forty that opened the exhibit in 1959, were selected from more than 400 negatives made by John Moyer, head of the Museum's Division of Motion Pictures, during his three-years' residence in India as a consul of the United States. The photographs chosen depict the different peoples and castes comprising the population of India, and also demonstrate the varied terrain encountered in traveling from the northern boundary of India along the Himalayan range down to the rain forests of Cape Comorin in the extreme southern tip. The small clay models of Indian people that are also a part of the exhibit are noteworthy because they represent a dying art in India which the present government is trying to restore.

Research Grant

The National Science Foundation has awarded a grant of $29,500 to the Museum to assist the research of Dr. Louis O. Williams, Curator of Central American Botany, on the *Flora of Guatemala*. The grant is to be applied over a period of five years. The research is a continuation of that initiated in 1941 by Paul C. Standley, then curator of the herbarium. Nine volumes of the *Flora* have been published by the Museum, and it is estimated to be more than half completed now. When the research project is completed it will be the first modern, comprehensive flora to be published on any part of the Mexican-Central American floristic region.

Scientific Meetings

In September, Dr. Edward Olsen, Curator of Mineralogy in the Department of Geology, attended meetings at the General Electric Laboratories in Milwaukee, Wisconsin. Dr. Olsen also lectured to the senior class of Air Force R.O.T.C. cadets at the Illinois Institute of Technology on the general geological features of the earth.

"The Hidden Potential of Museum Photography" was discussed by Mr. Homer V. Holdren, Assistant Photographer in the Division of Photography, at a panel discussion held during the annual meeting of the Midwest Museums Conference in East Lansing, Michigan. Other staff members attending the meeting were Mr. E. Leland Webber, Assistant Director, and Miss Miriam Wood, Chief of the Raymond Foundation.

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Members are requested to inform the Museum promptly of changes of address.

Dr. Robert H. Denison, Curator of Fossil Fishes, was elected vice-president of the Society of Vertebrate Paleontology and Dr. Rainer Zangerl, Curator of Fossil Reptiles, was elected secretary-treasurer at the Society's annual meetings held in the Museum last month. Newly elected president is Dr. Samuel Welles, from the University of California at Berkeley. Approximately 80 scientists who specialize in the study of fossil animals with backbones came to the meetings from various parts of the United States and Canada. During the conference Mr. William D. Turnbull, Assistant Curator of Mammals, discussed research on small fossil mammals.

Erratum

The author of the article, "Messengers from Outer Space," which appeared in last month's BULLETIN (November, 1961), is Dr. Sharat K. Roy, Chief Curator of Geology.

FROM THE BOOK SHOP

Holiday Gift Suggestions

In addition to a wide selection of books on natural history subjects for both adults and children, The Book Shop carries many other items that make fine holiday gifts. Below are a few suggestions especially for children (prices mentioned include tax and postage):

BIRD MOBILE—21 brightly colored birds make this mobile decorative as well as educational. Of easy-to-assemble cardboard $1.00

PEBBLE PUP SET—A boxed collection of 18 rocks and minerals, mounted and labeled, to get a young collector off to a good start. Also included is a 109-page book, *For Pebble Pups: A Collecting Guide for Junior Geologists*, written by a member of the Museum staff. $1.30

FOSSIL SET—A collection of 10 fossil specimens, including a dinosaur bone fragment. Each specimen is individually bagged and labeled. Two booklets, *Life Through the Ages* and *Your Own Collection of Fossils*, accompany the set. $2.00

For adults, The Book Shop has such rare and unusual gift items as standing drums from Northern Rhodesia, gay pottery "piggy" banks from Mexico, colorful seed necklaces from Haiti, wooden masks from Bali, lacquerware from Japan, and animal wood carvings from Kenya. Prices range from $1.00 to $56.00.

Living Fishes of the World

By Earl S. Herald. Doubleday and Co.: New York, 1961. 304 pp., 155 black and white, 145 full color illustrations. $12.50.

Dr. Herald, who is Curator of Aquatic Biology at Steinhart Aquarium in San Francisco, has provided the ichthyophile and ichthyologist alike not only with an excellent reference book but with a work so filled with interesting facts and outstanding illustrations that it is difficult to set it aside. Through his experiences as a diving ichthyologist and an aquarist, Dr. Herald has had ample opportunity to observe the behavior and habits of fishes firsthand. These observations, along with those of his colleagues, have been incorporated into the text, and in many cases a particular behavior trait is illustrated with photographs taken in nature or in the aquarium. For example, accounts of the parasite-picking activities of certain small fishes and shrimps are supplemented with pictures of them performing their grooming services. Interesting anecdotes enliven what might otherwise be, for the layman, dull accounts of length, weight, range, and numbers of species.

Dr. Herald is especially interested in the seahorses and pipefishes. To this interesting group, in which the males rear the young, he devotes four and one-half pages, discussing the life history, distribution, size, behavior, and care in captivity of various species. This is space well used, as seahorses in public aquariums command more interest than almost any other aquatic species.

In addition to the scholarly and readable text, this book presents one of the most magnificent collections of both black-and-white and color photographs of fishes yet published. With few exceptions the illustrations are of live specimens, many of them in their natural surroundings.

There are few criticisms to be made of this fine work. The misspellings are few and obviously typographical errors. However, its value could have been enhanced had there been some indication of size included in the photo captions. Although average and adult lengths are mentioned in the text, the uninitiated reader may be confused by the discrepancies in size of the yellow seahorse (plate 34) and the trumpetfish (plate 35). Likewise, the cuckoo wrasse (plate 67) is considerably larger than the bluehead (plate 68), although both are illustrated at approximately the same size. Also, the fact that certain fishes are figured in their juvenile coloration is not always indicated by the captions. The blue, French, and queen angelfishes (plates 55, 57, 62) are obviously young specimens. However, the author does make note of this in the text.

Although scientific and common names are constantly changing as a result of increased information, Dr. Herald has done a masterful job of applying the presently accepted names. One discrepancy, however, bears mention. The name "pigmy" sunfish is applied to *Enneacanthus gloriosus* (plate 44 and page 180) when it should be limited to members of the genus *Elassoma*, which the author calls "dwarf" sunfishes. *Enneacanthus gloriosus* should be rightly named the blue-spotted sunfish.

Undoubtedly the best work of its kind, *Living Fishes of the World* will provide hours of absorbing reading for young and old, amateur and professional. Along with the other volumes of the "World of Nature Series," it is available at The Book Shop.

WILLIAM P. BRAKER
Assistant Director
The John G. Shedd Aquarium

WINTER FUR 'N FEATHERS

(*Continued from page 3*)

After viewing this exhibit in Hall 18, visitors may follow their easy Journey instructions for a tour of animal exhibits with natural habitat backgrounds representing various climates all over the world. On the tour, children will find for themselves the answers to Journey questions about birds and mammals that make their homes near the two polar regions, swim in frigid waters, forage in high mountain regions, or inhabit the torrid tropics. By filling in their questionnaires on these exhibits, boys and girls may earn credits toward the Museum Journey awards presented twice a year.

(*Continued on next page*)

The range of exhibits covered by the tour not only shows the various coverings that animals have developed to protect them from the extremes of temperature, but also shows how many mammals and birds have solved the problem of harmonizing with their background to escape their enemies and to creep unnoticed upon their prey. In the far north, for example, polar bears and snowy owls are mostly white the year around, while in the tropics are found the birds and mammals with the brightest and most variegated coats to blend with tropical backgrounds. Still other animals have a dark summer coat that turns to white when the snow comes. In other types of seasonal change, male birds may wear a bright plumage during the mating season, and a dull coat at other times of the year. All these effects of climate and seasons on the fur and feathers of mammals and birds are illustrated in December's combined Featured Exhibit and Museum Journey.

PAULA R. NELSON

SURINAM DIARY

(*Continued from page 5*)

October 8: Six big tree frogs live in the trees near camp and their deep, guttural "croak, croak" dominates the night sounds. Found a pair of tinamous. . . . Seeds planted in the vegetable garden are sprouting.

October 10: Large bats bit holes in the bat net, and escaped. Collected a little orange and blue tanager, and another one all black with a white cap. Glittering blue morpho butterflies wing their way through the forest . . . and tarantula wasps, four inches long, steel blue with red wings.

October 16: Bush ticks were bothersome today . . . red welts and intermittent itching for several days follow each bite. We have cut six miles of trail toward the mountains.

October 29: Got two snakes this morning, one a lively blue.

November 2: Saw for the first time a troop of 25 squirrel monkeys and kesi monkeys feeding together, and a peccary eating the fruit they dropped. Pairs of large macaws cruise over the forest, giving raucous calls. An unforgettable sight was a dozen of these gorgeous birds feeding, cracking tough seed pods. . . the red and blue birds outnumber the yellow, ten to one.

November 15: Traveling down-river by canoe, we watched five giant otters playing tag. Curious, they came to meet us, and, only 15 feet away, treaded water and peered at us.

November 18: An ocelot came around camp last night . . . we saw his eyes gleam in the beam of our flashlight, and heard him call. From across the river came the noises of an ant bear ripping apart a termite nest.

November 26: We got a pair of small marmosets with brown hands . . . behave much like squirrels . . . give soft, plaintive whistles. Also bagged a harpy eagle that was dining on a monkey.

November 29: Traveling along the river, we saw kingfishers and river swallows . . . enormous trees and graceful palms . . . epiphytes . . . colorful blossoms. Toucans and red and blue macaws flew across the river, and "Pawis" bush turkeys walked along its bank. Hummingbirds came in to flowers. . . .

December 5: Rain yesterday and today in the mornings, but afternoons are sunny. It is the start of the little rains; the anumaras fish are moving upstream, ready to go up the small tributaries to spawn as soon as the rains raise the water level. When the big rains come in June and July, the whole forest will be flooded. Perhaps this is why there are so few small mammals here. A big agouti sat up like a squirrel, nibbling a fruit held in its forepaws. Suddenly taking fright, he dashed away, barking furiously.

December 10: Jacamars are at their nest holes—tunnels excavated in sandy loam. One tunnel ran diagonally for two and one-half feet, and in the nest cavity were two featherless nestlings resting on the sand, for these birds provide no lining for their nest.

Violent thunder and lightning now accompany the beginning of the little rainy season. Rains in the distant mountains have swollen the streams, which have risen three feet.

A black possum came to the bait station near camp last night. A large hawk darted into a tree where a troop of squirrel monkeys was feeding, but all escaped.

December 15: We followed the river. . . . Ten bushy-tailed monkeys, known as Beeson, sat swinging their tails pendulum-wise . . . several yellow-headed and one black and white king vultures flew up from a monkey carcass. We passed a tapir feeding on fruit dropped by Cebus monkeys.

December 18: Greenheart trees are leafless, but covered with a mass of yellow flowers which, when they fall, carpet the ground with gold.

December 20: Rain every morning now . . . many frogs call in the night. The river is up over the log bridge we built. Nights are quite cool, the temperature going down to 65° F. Big toucans are getting ready to nest, sitting on tips of tallest trees and singing a high-pitched yelp like that of a puppy, hour after hour. Saw a tinamou's nest with eggs . . . and a pair of parakeets excavating a nest burrow in a tree termite nest.

A beautiful day, the sky banked with cumulus against its deep blue.

December 25: Christmas tree is up . . . planted in front of the hut. Napoleon and Sagiman found a child's delight in decorating it with strings of pink flowers, strips of yellow palm-leaflets, and colorful bird and mammal skins.

December 29: Trees are blooming in profusion. Many black-headed and blue-headed parrots visit the blossoms. A tiny eared owl sits at the mouth of its tree-hole home. Some trees are in fruit, and toucans of several kinds, large tanagers, thrushes, antbirds, oropendolas, and a hawk-headed parrot come to them to feed. A fork-tailed hummingbird saddled her nest of down on a high slim branch . . . she goes to flowers for nectar, but seems to prefer gleaning spiders from their webs.

December 30: . . . at dusk, a thrush is singing a clear, warbling whistle. . . .

January 1, 1961: More trees are coming into bloom; some have blue blossoms, others mauve, vermillion, yellow, pink . . . the night air is heavy with their perfume. Trees that have stood leafless in the dry season have buds bursting and leaves growing. More birds are nesting.

January 2: Returned from the mountain trail with two birds new to the collection.

January 12: The first plane since early December came in to the airstrip, bringing a package and letters.

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